WEEKLY REPORTS
Of The Office Of
WESTERN IRRIGATION AGRICULTURE

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Newlands

The report for the period ending April 7 is as follows:

The spring of 1928 is very similar to the spring of 1927. The mean temperatures recorded at this station have been below normal, with minimum and maximum temperatures lower than a 22-year average. There have also been more cloudy days recorded than is usually the case. A summary of the March meteorological data follows:

	1928	22-year average
Temperature, mean maximum	61.4	58.8
" , mean minimum	31.9	27.5
" , mean	46.7	43.2
" , highest	77.0	73.6
" , lowest	20.0	15.5
Precipitation, inches	1.09	.38
Wind velocity, miles per hour	3.48	4.23
Evaporation, inches	3.11	3.97
Days clear	10.0	17.7
" partly cloudy	4.0	6.9
" cloudy	17.0	6.4

Last year the cool weather favored the development of the alfalfa aphids, causing about a 50 per cent decrease in the tonnage of the first crop of hay. At the present time choice hay is very scarce on the project and is selling for two or three dollars a ton more than in average years.

The usual spring seeding of grains has been finished at the Experiment Farm. The seedings were as follows: Plots D-1, D-5, E-1, E-2, E-7, E-8, F-1, Y-11, Y-12, Y-13, Y-14, and Y-18 were seeded to wheat. Plot Y-8 was seeded to barley. Plots Y-2, Y-3, Y-4, and Y-5 were seeded to oats.

Some fertilizer experiments have been started. Plots E-1, E-8, J-4, J-6, and Y-18 received an application of super-phosphate (18%) at the rate of 250 pounds per acre. Plot J-8 received an application of the same fertilizer (48%) at the same rate. Plots E-1, E-8, and Y-18 are seeded to wheat, and J-4, J-6, and J-8 are in alfalfa.

The orchard has been sprayed once for red spider with a lime-sulphur spray. All elm trees about the premises were given a heavy application of the same spray. This was done with a view to combating the elm scale. Several of these trees have become badly infected, and some of them that were planted several years ago by the city of Fallon have been almost killed by this pest.

One general irrigation has been given. Water was used copiously on all plots.

The laboratory work has consisted of experiments with conductances of different classes of soils and in boron tests on underground waters. In these conductance tests we are using station soils, which are being taken to a depth great enough to penetrate the water-table from places in the fields that show good, medium, and bad plant growth. The boron tests are being made on well waters from private farms and from test wells

Newlands (continued)

put down on the Experiment Farm. So far all wells have shown from a trace to 100 parts per million of boron. The waters of the 26 wells of the Y series have given a positive reaction for this salt.

E. W. Knight.

San Antonio

Report for the first three months of 1928.

The year 1928 started with the lowest temperature recorded since January 1918, a minimum of 16° F. being recorded the night of January 1. Small grains had been planted after the middle of December and as they were just emerging at the time, they were not damaged. Emergence of flax was also just beginning, and all plants which were out of the ground at the time were killed. The stands of some of the varieties were seriously reduced from this cause. Relatively cool weather had preceded this freeze. Little or no damage was done the deciduous fruits, but all citrus trees in the station orchards were frozen severely, with the exception of all citrange trees and one citrangequat, which suffered only the loss of a few of their most tender leaves. Strangely enough, the figs suffered less damage than in past winters when the minimum was 8° higher than during this year's record cold spell. This was undoubtedly due to their relative dormancy, induced by a dry fall and cool weather the latter half of December. Among the palm species represented on the station grounds the Canary Island palm (Phoenix canariensis) suffered most severely. All specimens of this palm had all leaves killed except the bases of a few of the very youngest. Some newly transplanted ones were entirely killed. The Washingtonia palms were next in degree of injury; about half the leaves on some specimens, and all the leaves on others, were killed. The Sabal palms and the blue palm (Erythea armata) came through with little or no damage, the latter proving especially hardy.

The weather warmed up very gradually following the initial cold, the maximum being 63 and the mean temperature 38.3 for the first week of the year. The last three weeks of January were unusually warm, with the result that the mean temperature for the month was almost exactly normal. Precipitation during January was in the form of small scattered showers and was of no value to winter crops. The weather during February was a mixture of warm days and cold days, with no extreme in either direction: there were clear days and cloudy days, with the latter predominating. Precipitation received in February was of such a nature as to be of value in keeping winter crops growing, but was not sufficient in amount to establish a reserve. Oats and other small grains were making very slow growth, almost no winter pasture was being produced, and the fields were getting to the stage of actual distress when a rain of 2.00 inches occurred the night of March 9. The bulk of this precipitation fell within a very few minutes time and was largely lost by run-off. Winter crops were revived only temporarily and as no more rain fell during the remainder of March, prospects for satisfactory yields were very discouraging. Strong winds occurred in the afternoon of almost every day the last two weeks of the month and soil blowing was excessive for this section. Truck crops and the leaves of corn and sorghums were badly whipped and broken by these winds.

San Antonio (continued)

The meteorological data recorded at the station for the period are summarized by weeks and months in the following table.

Week ending	Temperature (° F.) Maximum Absolute	Maximum Mean	Minimum Absolute	Minimum Mean	Mean	Precipitation (inches)	Sky (days) Clear	Partly cloudy	Cloudy
Jan. 7	63	46.6	16	30.0	38.3	.63	2	2	3
" 14	78	72.3	32	37.3	54.8	.01	4	3	0
" 21	80	67.0	33	50.6	58.8	.19	0	0	7
" 28	71	63.3	31	39.1	51.2	Tr.	2	3	2
Feb. 4	78	66.4	38	49.6	58.0	1.02	1	1	5
" 11	78	65.9	43	48.6	57.2	.47	1	1	5
" 18	77	63.0	31	38.3	50.6	.43	4	1	2
" 25	76	61.9	32	40.0	50.9	.77	1	3	3
Mar. 3	78	68.9	37	46.9	57.8	0	3	1	3
" 10	84	75.4	49	55.0	65.2	2.05	2	1	4
" 17	90	76.1	32	48.3	62.2	Tr.	3	2	2
" 24	93	78.7	37	48.7	63.7	Tr.	2	3	2
" 31	97	86.1	40	49.1	67.6	0	5	2	0
Month of January	80	63.3	16	39.6	51.5	.83	9	9	13
Month of February	78	64.2	31	44.1	54.1	2.30	9	6	14
Month of March	97	78.0	32	50.5	64.2	2.05	12	8	11

All experiments with spring-seeded crops, except cotton, have been planted at about the normal dates. All corn plantings emerged to excellent stands and at the end of March appear vigorous in spite of the wind-beaten condition of the leaves. Grain sorghums came up to satisfactory stands in most cases but have suffered more from the wind and blowing sand than has the corn. Sudan grass and sorgo were planted after the middle of March and, owing to the excessively drying winds which followed, the stands secured in many cases were quite spotted. There is little or no seedbed moisture available at this time for cotton planting.

A total of 90 fruit trees, received from the Office of Foreign Plant Introduction, were set in station orchards during the fore part of February. This lot of trees was made up as follows:

60 Amygdalus persica
14 Amygdalus persica nectarina
6 Amygdalus davidiana
2 Prunus ansu
2 Prunus armeniaca
6 Prunus mume.

In addition to operations incident to making the above plantings, work performed during the period has included the following: Repair of farm fences, buildings, and machinery; winter plowing of rotation and rootrot experiment plots; building a new cess-pool at the farm residence; building a soil-saving dam at the lower end of the draw on field E-3;

San Antonio (continued)

building a new compost pile; spraying vineyards; planting garden; collecting, cleaning, and painting orchard stakes; white-washing the greenhouse; cultivating orchards and fallow plots; removing mistletoe from trees on the grounds; chopping Johnson grass from miscellaneous plots and fields; and soil-moisture sampling.

Mr. C. S. Scofield was a station visitor on March 11.

Geo. T. Ratliffe.

Scotts Bluff

The average maximum temperature for the week ending April 7 was 62, with a maximum of 75 on the 2d; the average minimum temperature was 29, with a minimum of 17 on the 7th. No precipitation was recorded.

The annual Lamb Feeder's Day was held at the station on Thursday, April 5, with a number of able speakers appearing on the program. Many issues in regard to lamb feeding and marketing were discussed, probably the most interesting one being the "Buying of Feeder Lambs", this being handled from the buyer's standpoint and also from the viewpoint of the producer.

No actual field work has begun at the station except the hauling of manure and harrowing of some of the experimental plots to conserve the moisture. Considerable pruning of trees and shrubbery has been done during the past winter. The road from the station to the highway has been graded and greatly improved.

The average maximum temperature for the week ending April 14 was 47, with a maximum of 60 on the 11th; the average minimum temperature was 12, with a minimum of 5 on the 8th. No precipitation was recorded.

Moderate temperatures have prevailed the most of the week, making field work possible. Manure has been hauled and the plots for the various experimental work of sugar beets are being prepared.

One car of the experimental lambs fed last winter was shipped on April 9 to Omaha, where they sold for $16.50 per hundredweight. The average weight was 90 pounds. The rest of the lambs--about 100 in number--will be shipped April 16.

Three judging teams from Sidney, Chappell, and Sunflower came to the farm on Friday and participated in a contest, which was won by Sidney, with Sunflower second, and Chappell third. Alfalfa seed, sweet clover seed, corn, barley, oats, flax, potatoes, and wheat were judged, also draft horses, dairy cows, beef cows, breeding ewes, and hogs.

The average maximum temperature for the week ending April 21 was 62, with a maximum of 77 on the 18th; the average minimum temperature was 30, with a minimum of 24 on the 15th. The precipitation for the week was only .03 inch.

Weather conditions have been favorable for field work, and considerable plowing, harrowing, leveling, and planting has been done. All of the sugar plots in Field K have been planted. A light rain, turning into snow, which came Friday night, will help greatly in the germination of the beet seed. Spring work is pretty well advanced because of the very open weather conditions.

Scotts Bluff (continued)

The rest of the experimental lambs were shipped last Monday to Omaha, where they brought $16.10 per hundred, having an average weight of 95 pounds each. They will show a very good margin of profit for the season.

The average maximum temperature for the week ending April 28 was 62, with a maximum of 68 on the 27th; the average minimum temperature was 31, with a minimum of 24 on the 22d. No precipitation was recorded.

Weather conditions have been favorable for field work, and great progress has been made in preparing and planting the various crops for experimental work. All sugar beet plots have been planted and practically all oats. Moisture is greatly needed to bring up the sugar beet seed. So far this spring moisture has been very limited.

The farm ewes have all lambed with an average of about 180 per cent of lambs. Feeder calves purchased last fall have been dehorned and will soon be put on pasture for the summer.

James A. Holden.

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Belle Fourche

On June 5 Mr. Aune reported as follows:

The spring has been rather favorable so far with the exception of two wind-storms in May, which did considerable damage by moving soil. Some of the beets and grain had to be replanted. There was a good rain on May 18, and good stands have been secured on all crops. The first cutting of alfalfa has been irrigated once. If there is no rain within the next few days, the small grain must be irrigated. The beets will be ready to thin this week.

The lambs have done well. Eighty-two ewes have at this time 140 lambs, whose average weight on May 24 was 54 pounds. One buck lamb weighed 92 pounds. The pigs have also done well. Five sows have at this time 55 pigs.

The sugar factory secured the desired acreage, about 11,000 acres. The labor situation as regards beets is much better than last year.

Beyer Aune.

Huntley

Report for the week ending May 26:

Weather conditions during the spring have been very unfavorable for starting crops. While seeding was accomplished in good season, the lack of rainfall during April and May has resulted in rather uneven stands, and has required irrigation in many cases for the germination of seeds. The outlook for beets is especially unfavorable, and many fields on the project are now being reworked and seeded to other late crops, including grains and beans.

The original contracted acreage of sugar beets was about three-fourths of that of last season, due to the failure of the Growers' Association to reach an agreement with the Sugar Company as to the price to be paid for the beet crop. The contract offered by the Company guarantees an initial payment of $7.50 per ton, with any additional payments dependent on the sugar content of beets, the selling price of the sugar manufactured from this year's crop, and an additional bonus payment in case the sugar production for the entire factory district exceeds a certain amount. A large number of association member growers have contracted to grow beets without release from the Association.

The decrease in beet acreage has resulted in an increased acreage being planted to beans and grains.

Conditions on the dry lands adjacent to the project are rather unfavorable at this time due to the prolonged drouth. Winter wheat has already suffered severely from this cause.

Station work during the past week included principally the irrigation of beets, beans, and grains to provide moisture for germination.

The maximum temperature was 92, minimum temperature 38, and no precipitation.

Huntley (continued)

Weather conditions continued rather unfavorable during the week ending June 2. The light rains that occurred were not sufficient to afford much relief from drouth conditions that have prevailed during the past two months. Frost on May 30, when the minimum temperature was 31°, is reported to have caused some damage to beans and corn on parts of the project, although none was noticed on the station. The local representative of the Sugar Company reports a loss in beet acreage of at least 25 per cent due to stand failures as the result of drouth. The failure to obtain stands is particularly serious on the heavier soils of the project. Winter wheat on the uplands is heading short and gives indication of low yields.

At the station the main work was irrigating. It has been necessary to irrigate all crops for a full germination of seed. Fair though uneven stands will be obtained in most cases.

The maximum temperature was 93, minimum 31, and precipitation .07 inch.

Dan Hansen.

San Antonio

On June 13 Mr. Ratliffe reported as follows:

Under date of June 11 the San Antonio Express quotes the local Weather Bureau Office's records to the effect that in the early morning of June 10 there was a precipitation of .18 inch, and the wind attained a maximum velocity of 24 miles per hour for a short period.

At the San Antonio Field Station, beginning at 2:40 a.m. June 10 and continuing for about three minutes, hail of a maximum diameter of one-half inch fell. For the following twelve minutes rain fell. Both phenomena were accompanied by a wind which reached a velocity of more than 60 miles (estimated) per hour. The results were 2.31 inches of precipitation; rather severe soil washing in half a dozen locations on the farm; corn and sorghum leaves severely shredded and stalks bruised, broken, and lodged; flax and small grains in shock partially threshed; standing flax threshed "in place"; cotton stripped of everything except a portion of the main stem; trees partially defoliated and many limbs broken out, with part of the fruit beaten from some fruit trees and the remainder badly bruised; and several pieces of corrugated roofing blown from the machinery sheds, the barn, and my garage. Such garden crops as tomato, cucumber, squash, okra, pepper, and egg plant were badly mutilated.

The destructive portion of this storm was decidedly local, as a survey made Sunday morning revealed no hail damage south of our rotation fields nor further than a quarter of a mile from the station in other directions. Large limbs were broken from mesquite trees as far as a half mile north of us.

Assuming no further damage, we should harvest a fair to good crop of corn and sorghums, unless the shredding of the leaves and bruising of the stalks depresses the yields more than I now anticipate. I am afraid to attempt to appraise the damage done to cotton, having never had an opportunity to see what recovery could be expected of such severely defoliated and delimbed plants. It is my impression that replanting would be folly this late in the year.

San Antonio (continued)

No harm resulted to anyone on the station, and no serious damage was done to any of the buildings.

Geo. T. Ratliffe.

Scotts Bluff

The average maximum temperature for the week ending May 5 was 66, with a maximum of 86 on the 2d; the average minimum temperature was 36, with a minimum of 27 on April 30. The precipitation for the week amounted to .54 inch.

This week has been very favorable for field work. The long drouth was broken on the 2d by a good rain, which has done a great deal of good to alfalfa fields and grain and sugar beets. Sweet clover pasture has received some irrigation. The farm ewes and their lambs have been put on pasture.

It is estimated that fully 50 per cent of alfalfa in the valley has been winter-killed. If this situation continues, it will be serious.

The average maximum temperature for the week ending May 12 was 77, with a maximum of 90 on the 8th; the average minimum temperature was 47, with a minimum of 39 on the 6th. No precipitation was recorded.

Weather conditions have been very favorable for field work, although moisture is greatly needed for growing crops. The season so far has been very dry. The crops, however, are coming up with a good stand.

Farm ewes and their lambs have been put on pasture, and feeder calves will also be put on pasture this week.

The average maximum temperature for the week ending May 19 was 66, with a maximum of 72 on the 18th; the average minimum temperature was 46, with a minimum of 43 on the 13th. The precipitation amounted to 1.58 inches.

Weather conditions have been very favorable for growing crops, and practically all planted crops are up. A heavy rain started last Sunday night and continued through Monday and Tuesday; it has done a great deal of good.

The feeder calves which have been on test during the past winter were taken to pasture for the summer.

The average maximum temperature for the week ending May 26 was 77, with a maximum of 87 on the 24th; the average minimum temperature was 44, with a minimum of 40 on the 22d. No precipitation was recorded.

The rains of last week have greatly aided crops; they are growing rapidly. Sugar beets are up to a good stand and will soon be ready to be thinned and blocked.

Ninety feeder calves which have been on test during the past winter were taken to pasture. The spring pigs have been weaned, and they will be vaccinated and put on pasture this week.

The maximum temperature for the week ending June 2 was 78, with a maximum of 85 on the 30th; the average minimum temperature was 50, with a minimum of 48 on the 2d. The precipitation amounted to .73 inch.

The week has been very favorable for growing crops. The moisture has been plentiful and all crops have been greatly benefited. Sugar beets

Scotts Bluff (continued)

have been cultivated and will be thinned and blocked the coming week. They show a very good stand.

The average maximum temperature for the week ending June 9 was 69, with a maximum of 83 on the 7th; the average minimum temperature was 46, with a minimum of 41 on the 5th. The precipitation was .75 inch.

Last week was favorable to growing crops, but temperatures have run fairly low. A very good rain on the 3d has put all crops in fine growing condition. Owing to the scarcity of help, the thinning and blocking of beets was not commenced until this morning. Corn and beets are being cultivated. The first crop of alfalfa is about ready to cut.

Mr. H. O. Werner, with two assistants, was at the station on Thursday and Friday planting the experimental plots of potatoes.

The average maximum temperature for the week ending June 16 was 66, with a maximum of 81 on the 15th; the average minimum temperature was 42, with a minimum of 28 on the 13th. The precipitation amounted to 1 inch.

Considerable rain during the week has been of benefit to growing crops, but it has delayed field work so that weeds have grown rapidly. Sugar beets are now being thinned and cultivated. Various plots of experimental potatoes are now being planted.

Mr. Don B. Whelan, of the University of Nebraska, is spending several days in the valley making a survey of alfalfa weevil.

The average maximum temperature for the week ending June 23 was 73, with a maximum of 77 on the 21st; the average minimum temperature was 45, with a minimum of 40 on the 19th. The precipitation was .92 inch.

Last week was rather cool with rains nearly every day, which have greatly delayed field work and have also damaged the alfalfa which was cut the first part of the week. Steady, warm weather is needed to keep crops growing as they should.

The average maximum temperature for the week ending June 30 was 73, with a maximum of 79 on the 29th; the average minimum temperature was 50, with a minimum of 46 on the 25th. Precipitation for the week was .70 inch and for the month 3.72 inches. The precipitation for June 1927 amounted to 3.93 inches.

Rather cool temperatures have prevailed most of the week. Continued rains have supplied more than enough moisture for growing crops. In fact, there has been too much moisture for some crops. Hot growing weather is greatly needed. The first cutting of alfalfa has been wet; in some instances it was rained upon two and three times before it was stacked.

James A. Holden.

Yuma

On May 16 Mr. Noble reported as follows:

The unfavorable windy weather with intermittent cool periods has continued since the first part of March. Those growers who fortunately planted during one of the in-between spells have secured satisfactory stands. Many others, however, have rewatered, replanted, and in some cases plowed up to start all over again. The condition on the project is perhaps 85 per cent of normal.

The Colorado River is now in flood; a crest of about 70,000 second-feet is expected the latter part of this month. This early run-off will probably give us about the same performance that proved to be so favorable last year.

Plantings on the station are in nice shape. Only one plot of Pima cotton in the rotations had to be replanted. All other cotton plots have been thinned and cultivated three times. The big Bermuda grass and sandbur fight is now on. Barley and wheat plots are in the shock. The second cutting of alfalfa was put up last week. The new rotation plots appear to be very uniform.

E. G. Noble.

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Newlands

The weather this summer up to the period ending July 21 has been about normal. Ideal growing weather, an early spring, and the lack of any serious pest have resulted in a decided improvement in the appearance of crops over that of last year. There was a heavy yield of first crop hay over the project. At present the farmers are cutting grain, of which good yields are reported. In fact, if the present growing condition continues, there should be large crops of hay and grain and early maturing fruits and melons.

The comparative monthly weather report for July is as follows:

	1928	22-year average
Temperature, mean maximum	93.3	93.1
" , " minimum	52.4	54.1
, "	72.8	73.6
, highest	103.0	100.4
, lowest	43.0	43.7
Precipitation, inches	Trace	.16
Wind velocity, miles per hour ...	2.34	2.81
Evaporation, inches	8.76	10.18
Days clear	24.0	23.5
" partly cloudy	1.0	4.8
" cloudy	6.0	2.8

The work at the station has consisted of the usual irrigating and cultivating. The first crop of hay has been cut and record yields recorded. The second crop will be ready for cutting in about one week, and indications are that it also will be fine.

The continued use of manures, gypsum, green cover crops, and the heavy application of water are having their effect each year on the productivity of the farmed area of the station. Areas that a few years ago showed but little plant growth are at present producing at the rate of 1½ tons of alfalfa hay to the acre at each cutting. More hay was cut during the first cutting this year than during any two cuttings in 1921.

The barley on F-8 and the oats on Y-2, 3, 4, and 5 were cut on July 8. The wheat on D-1, D-5, E-1, E-2, E-7, E-8, F-1, Y-11, Y-12, Y-13, Y-14, and Y-18 was cut July 19 and 20. This grain still remains in the shocks and will be threshed at an early date.

The variety test with potatoes this year was planted on May 11. The varieties on test are Portland Netted Gem, Burbank, Pride of Multonomah, Eureka, and Colorado Netted Gem.

The variety test with corn was planted May 12 and the following varieties were used: DeWolf's Prolific, Wisconsin No. 7, Wimple's Yellow Dent, White Pearl, Minnesota No. 13, Northwestern Dent, Early Murdock, and Rainbow.

On May 22 about one acre was planted to safflower seed. This area had been plowed and releveled, flooded and harrowed before it was planted. The light soil and heat did not seem to suit this crop, which

Newlands (cont'd)

made such slow growth that the weeds finally got the better of it. On July 12 this area was plowed in order to destroy the rank growth of weeds.

Throughout the growing season all plots have been irrigated every two weeks. A heavy application of water has been given at each irrigation on the theory that such a practice will prove more beneficial than light applications when the land receiving water lies in an alkaline area. So far the assumption seems to be correct.

During these runs two gypsum distributing machines have been operated. One treats the water being applied to H-6, 7, 8, 9, 10, 11, and 12, and the other the irrigation water of plots on the Y series. The H plots mentioned have been treated during the last two summers; and there has been a marked improvement in the texture of the soil in the so-called "slick spots." The Y series machine is a new one constructed this spring. With this machine it has been possible to get as much as 1400 pounds of gypsum into solution in each acre-foot of water.

The station visitors have been Mr. A. C. Cooley, Mr. S. B. Doten, Director of the Nevada State Experiment Station; and Mr. S. H. Hastings, of our office, who arrived here on July 16 en route to Washington. While here he acquainted himself with the farm conditions and also obtained a general idea of the type of agriculture being followed on the project. Several matters pertaining to the work at this station were discussed and some future plans made.

A great deal of work is being done in the laboratory on soil and water conductances and borax toxicity. The greater portion of the wells over the project are found to have some borax present. Several of the Y wells run high enough to be toxic. In fact, this salt seems to be fairly well distributed over the project but does not seem to be particularly toxic to alfalfa in its present concentration in local soils.

E. W. Knight.

San Antonio

Report for the three months ending June 30.

The climatological data recorded at the U. S. San Antonio Field Station during the months of April, May, and June are summarized by weeks and months in the following table.

San Antonio (cont'd)

Week ending	Temperature (degrees F.) Maximum Absolute	Maximum Mean	Minimum Absolute	Minimum Mean	Mean	GDR.	Precipitation (inches)	Sky (Days) Clear	Partly cloudy	Cloudy
Apr. 7	89	81.1	44	57.1	69.1	39	.56	2	2	3
" 14	83	64.9	34	43.4	54.2	32	1.47	1	3	3
" 21	95	82.7	37	57.4	70.1	36	0.0	3	2	2
" 28	88	81.4	43	51.0	66.2	36	0.0	4	3	0
May 5	93	84.4	50	60.9	72.6	31	.24	2	2	3
" 12	92	85.4	49	56.3	70.9	40	2.78	4	0	3
" 19	88	82.3	57	66.4	74.4	19	.35	0	3	4
" 26	94	88.1	52	60.3	74.2	37	.16	5	0	2
June 2	100	90.7	62	67.4	79.1	35	3.58	0	4	3
" 9	94	89.9	58	67.3	78.6	31	2.31	3	4	0
" 16	94	89.1	54	70.7	79.9	28	.58	0	6	1
" 23	101	97.1	70	73.9	85.5	29	0.0	5	2	0
" 30	102	98.3	71	73.3	85.8	29	0.0	3	4	0
Month of:										
April	95	78.4	34	52.8	65.6	39	2.03	11	11	8
May	100	86.1	49	62.1	74.1	40	5.35	10	8	13
June	102	92.9	58	70.9	81.9	31	4.65	11	15	4
Jan. 1 to June 30	102		16				17.21	62	57	63

Only .03 inch of rain was received from March 10 to April 7, and practically all small grains burned beyond recovery. During the four days, April 7 to 10, inclusive, a total of 2.00 inches of precipitation was received in the form of slow showers, practically all of which went into the soil.

Flax, and a few of the less severely burned plots of small grain, revived somewhat and made use of this moisture; the majority of the plots, however, had already passed beyond the point where recovery was possible. Corn and the sorghums benefited greatly from these rains; and the germination of cotton, which had just been planted in seedbeds of very limited moisture supply, was assured. No more rains occurred during April, nor any of value during May up to the 12th. A good rain of 3.04 inches, relatively little of which was lost by run-off, occurred May 12 and 13. Beneficial rains of 1.82 inches and 1.72 inches occurred May 28 and June 1, respectively.

The vitality of corn pollen was undoubtedly lowered by the drought which preceded the flowering of that crop, but the plants were revived by the rain of May 12 to such an extent that a fairly satisfactory set of grain was made. The heads produced by the grain sorghums were smaller than normal, but were well filled; the damage done by sorghum midges was negligible. On June 9 prospects looked favorable for above-normal yields of corn and grain sorghums; and cotton, which was just beginning to bloom freely, was growing very satisfactorily.

Early in the morning of June 10 there occurred a terrific windstorm accompanied by about 3 minutes of hail and 10 minutes of rain, which completely changed the season's prospects at the Station. Cotton

San Antonio (cont'd)

plants were completely defoliated and de-limbed except at the extreme south end of the rotation fields, which was the southern limit of the hail area. The leaves of corn were completely shredded and stalks were bruised, split, and lodged. Sorghums were shredded, much grain threshed from the heads of those furthest advanced, many stalks broken, and heads laid on the ground. Fruit trees and grape-vines were partially defoliated, the fruit in many cases entirely stripped off while all which remained was badly bruised, and the bark on most of the smaller branches was severely lacerated. Truck crops and annual ornamentals were annihilated. A few trees were blown down while several others had large limbs broken out. Roofs of some of the outbuildings were partially destroyed. A total precipitation of 2.31 inches was recorded for the period of less than 15 minutes. Severe soil washing occurred in a few spots on the farm. The storm was very local; hail damage could not be found more than half a mile from the station in any direction, and evidences of destructively strong wind could be found very little further.

The percentage of cotton plants which revived growth to any degree whatever on 23 of the rotation plots ranged from 2.0 to 44.5. On the seven other plots from 47.5 per cent to 94.2 per cent of the original plants showed some evidence of attempting to renew growth. The first mentioned 23 plots were disked out and will be held fallow. The seven plots are being retained for the purpose of studying cotton rootrot on them. From 88.0 per cent to 99.5 per cent of the plants in the rootrot-fallow experiment on field C-5 were killed. All variety plantings on C-3 and spacing test and cooperative series plantings on A-3 were killed practically 100 per cent. The field of Kekchi progenies on the Herbst farm, being on the leeward side of the Farm grounds, was somewhat less severely damaged than other fields and has been retained to save seed of the selections in so far as possible.

The last half of June was extremely dry with maximum temperatures ranging from 94 to 102 degrees. The crop from the few small grain plots which produced grain, and from all the flax plots, was threshed June 18 to 21, inclusive. Plot A4-6, biennially cropped, was the only rotation oat plot from which grain was saved; it yielded at the rate of 1.6 bushels per acre. Three plots in the cotton rootrot fallow experiments were planted to oats for grain, but only C5-7 (following fallow) produced grain - at the rate of 2.0 bushels per acre. The results obtained from the small grain variety test (planted in triplicated one-fortieth acre plots) are summarized in the following table.

San Antonio (cont'd)

Small Grain Variety Test, 1928

Crop and Variety	Yield per acre				Average weight per bushel
	First plot	Second plot	Third plot	Average	
	Bus.	Bus.	Bus.	Bus.	Lbs.
Oats:					
Selection 1913	6.8	12.4	15.8	11.7	23.5
Texas Red Rustproof	4.0	15.7	8.3	9.3	24.3
Ferguson 922.....	7.8	13.1	15.0	12.0	23.7
Lee	Complete failure				
Fulghum	Complete failure				
Barley:					
Hannchen	14.0	13.4	17.8	15.1	49.7
Orel	3.5	7.1	7.5	6.0	42.0
Wisconsin Winter ..	3.8	6.3	7.8	6.0	36.7
Tenn. Winter 3543	2.9	7.1	10.3	6.8	36.8
Tenn. Winter 3546	8.8	11.7	9.0	9.8	35.3
Texas Winter	4.6	9.5	13.3	9.1	32.7
Stavropol	3.2	9.2	10.2	7.5	31.5
Wheat:					
Kubanka	5.5	9.3	10.5	8.4	58.3
Kanred	*	*	*	.64	----
Blackhull	.53	.80	1.46	.93	----
Harvest Queen	.13	.13	1.00	.42	----
Speltz	Complete failure				
Texas Winter Rye	Complete failure				

*All Kanred plots threshed together by mistake.

Flax yields, as summarized in the following table, were quite encouraging, especially when considered in comparison with the practical failure of other winter crops. Ten varieties were compared, being planted in one-thirtieth acre duplicated plots, with the check variety planted in every fourth plot.

San Antonio (cont'd)

Flax Variety Test, 1928

Variety	C.I. No.	Yield per acre: First plot	Second plot	Third plot	Average	Average weight per bushel
		Bus.	Bus.	Bus.	Bus.	Lbs.
N.D.R. 114 1/	13	----	----	---	10.9	---
Redwing	320	2.8	4.5	4.9	4.1	52.2
N. D. 720	318	7.9	7.4	10.4	8.6	53.8
Linota	244	8.6	9.2	11.4	9.7	54.2
Selection 4-1	260	2/	11.9	13.4	12.7	52.5
Bison	---	2/	10.1	9.8	10.0	52.5
Long 79	280	8.1	11.4	11.6	10.4	52.7
Morteros	107	13.0	12.4	14.6	13.3	52.3
Rosquin	109	13.7	13.6	14.3	13.9	51.7
Winona	---	6.9	5.5	6.4	6.3	51.3
Time-of-Planting Test--C.I. 13						
December 22	---	----	---	---	8.1	53.5
January 21	---	----	---	---	.3 3/	----
February 24	---	----	---	---	1.4 4/	40.5
March 19	---	----	---	---	1.3 4/	48.0

1/ Average of ten check plots.
2/ These two plots were accidentally mixed at time of harvest.
3/ Almost completely threshed by hail on June 10 while in shock.
4/ Suffered severely from hail and drought.

Official visitors at the station during the period of this report have included:

Mr. D. R. Hooton, Office of Cotton, Rubber and Other Tropical Plants, April 16, 17, 18 and May 22 and 23.

Dr. David Fairchild, Office of Foreign Seed and Plant Introduction, April 28 and 30.

Mr. F. A. Coffman, Office of Cereal Crops and Diseases, June 7.

Messrs. Henry Dunlavy and B. F. Dana, Superintendent and Plant Pathologist, respectively, of Texas Substation No. 5, Temple, Texas, June 26.

Geo. T. Ratliffe.

Scotts Bluff

The average maximum temperature for the week ending July 7 was 87, with a maximum of 94 on the 6th; the average minimum temperature was 57, with a minimum of 49 on the 2d. Precipitation for the week amounted to .11 inch.

Warmer weather has greatly helped all growing crops, especially sugar beets and small grain. Grain plots are being irrigated, and sugar beets will soon be watered if the rainfall is not sufficient. Second growth alfalfa is coming along fast.

Scotts Bluff (cont'd)

The average maximum temperature for the week ending July 14 was 84, with a maximum of 90 on the 10th; the average minimum temperature was 51, with a minimum of 45 on the 8th. Precipitation during the week was .12 inch.

Weather conditions have been very favorable for growing crops. A light rain fell on the afternoon of the 13th. A good soaking rain is needed for potatoes and sugar beets. Grain plots are being irrigated, and sugar beets will be watered soon.

The average maximum temperature for the week ending July 21 was 86, with a maximum of 93 on the 17th; the average minimum temperature was 60, with a minimum of 55 on the 15th. Precipitation for the week was .52 inch.

Weather conditions have been favorable for growing crops. Frequent rains through the valley have been recorded. The first irrigation of sugar beets has been completed.

The average maximum temperature for the week ending July 28 was 82, with a maximum of 86 on the 23d and 28th; the average minimum temperature was 55, with a minimum of 53 on the 26th. Precipitation during the week was 1.78 inches.

The week has been very favorable for growing crops. The second cutting of alfalfa has been harvested, and several plots of oats have been cut. Practically all small grain crops are ripe. The heaviest rain of the season occurred on the afternoon of the 27th, continuing through the night. A total of 1.65 inches of rain was recorded.

Mr. James A. Holden is confined to the hospital in Scottsbluff with a severe attack of poison ivy.

Mr. A. C. Cooley, in charge of Demonstrations on Reclamation Projects, visited the station last week.

The average maximum temperature for the week ending August 4 was 82, with a maximum of 93 on the 1st; the average minimum temperature was 57, with a minimum of 45 on the 4th. The precipitation was .07 inch.

The weather has been very favorable for growing crops. Very little rain has fallen during the week. The heavy rain of last week has greatly aided growing crops.

Preparations are being made for the annual Farm Picnic, which will be held on Thursday, August 9.

The average maximum temperature for the week ending August 11 was 88, with a maximum of 95 on the 10th; the average minimum temperature was 53, with a minimum of 47 on the 6th. No precipitation was recorded.

The very warm weather has kept all crops moving along fast, but a good rain is needed to freshen things up. There has been considerable wind the latter part of the week.

The annual farm picnic was held at the station on Thursday, August 9. About one thousand persons enjoyed the club demonstration work, the crop rotation work, and the program of races which had been arranged.

Scotts Bluff (cont'd)

The average maximum temperature for the week ending August 18 was 90, with a maximum of 96 on the 13th; the average minimum temperature was 56, with a minimum of 48 on the 18th. No precipitation was recorded.

Very high temperatures have prevailed all week with no moisture, although crops are growing nicely under irrigation.

The Annual Potato Tour was held on Thursday. Prof. Wm. Stuart from Washington, D. C., was one of the speakers at the station.

The average maximum temperature for the week ending August 25 was 85, with a maximum of 96 on the 21st; the average minimum temperature was 51, with a minimum of 42 on the 25th. Precipitation for the week amounted to .26 inch.

Weather conditions have been favorable for growing crops, although frequent winds have absorbed considerable moisture. A light rain Friday afternoon has helped greatly. Station threshing has been completed. Sweet clover plots are now being irrigated.

James A. Holden.

MISCELLANEOUS

Mr. Hastings Appointed

Mr. Stephen H. Hastings has been appointed Senior Agronomist, Office of Western Irrigation Agriculture, with headquarters at Phoenix, Arizona.

Mr. Hastings was first employed in this office in 1906 at the San Antonio Experiment Farm, where he remained until 1916 when he transferred to the Sacaton station. In 1920 Mr. Hastings left the Government service to become agricultural adviser and later ranch manager for the Southwest Cotton Company at Phoenix, Arizona.

In the Office of Western Irrigation Agriculture Mr. Hastings will have general supervision of the work of the field stations and of the Washington office during the absence from Washington of Mr. Scofield, who will devote his attention during the coming winter to investigations of the boron and related alkali problems in southern California.

Boron Investigations

The current appropriation act provides funds enabling the office of Western Irrigation Agriculture to undertake an investigation of the problems involved in the occurrence of boron in irrigation waters in southern California. This work on the boron problem has been inaugurated through the establishment of two field laboratories, one on the Limoneira Ranch near Santa Paula, California, under the direction of Mr. L. V. Wilcox; and the other, known as the Rubidoux Laboratory, at Riverside, California, under the direction of Dr. F. M. Eaton.

The work at Limoneira will have to do chiefly with delimiting the areas of boron occurrence and injury, while at Rubidoux the work will center around the physiological effects of boron on crop plants.

C. S. S.

WEEKLY REPORTS
Of The Office Of
WESTERN IRRIGATION AGRICULTURE

Vol. XXX September, 1928 No. 9

San Antonio

Report for nine weeks ending September 1.

No rainfall of agricultural value occurred between June 13 and August 31. In the afternoon of the latter date a heavy downpour of something more than an inch of rain was followed by a gentle precipitation which brought the total for the day to 2.16 inches. A high percentage of run-off and some soil washing resulted. Temperatures were above normal for both July and August, although no extremely high maximums were recorded. Wind movement was approximately 10 per cent above normal for the period. Evaporation from a free-water surface was likewise about 10 per cent above normal for July, but for August it was exactly normal.

All vegetation suffered severely, pastures dried up, large areas of hay sorghums died out completely after the first crop had been harvested, and cotton bolls were drying open as early as the first of August. The degree of infestation of the cotton boll weevil was spotted in the early part of the season, being severe in some sections while practically negligible in others; but by the latter part of July practically no flowers were being permitted to open in any fields and a high percentage of locks of partly grown bolls was being destroyed. No outbreaks of cotton fleas nor of cotton leaf worms are known to have occurred in this region to date. Cotton rootrot appeared in scattered areas of small extent throughout the region early in the season, but the continued dry weather coupled with an original shortage of subsoil moisture has prevented its rapid spread, and a very few large areas of dead cotton are to be found at the end of August.

A summary of the climatological data recorded at the station for July and August is given in the following table:

Week ending	Temperature (degrees F.) Maximum: Absolute	Maximum: Mean	Minimum: Absolute	Minimum: Mean	Mean	G. D. R.	Precipitation	Sky (days): Clear	Partly cloudy	Cloudy
							Inches			
July 7	101	97.0	71	73.3	85.2	30	.08	2	3	2
" 14	100	96.9	69	70.9	83.8	31	.21	4	2	1
" 21	103	101.0	70	73.3	87.1	31	---	5	0	2
" 28	100	98.6	70	73.1	85.9	30	.29	1	4	2
Aug. 4	102	99.7	73	74.1	86.9	28	---	3	1	3
" 11	102	99.0	71	73.3	86.2	28	.24	1	4	2
" 18	103	100.4	73	73.7	87.1	30	.19	6	1	0
" 25	101	99.0	69	74.8	86.9	31	---	3	3	1
Sept. 1	102	98.6	71	71.9	85.2	30	2.25	1	5	1
Month of July	103	98.4	69	72.8	85.6	31	.58	13	9	9
Month of Aug.	103	99.7	69	73.5	86.6	31	2.66	13	15	3

San Antonio (cont'd)

Station operations during the period have included harvesting of all corn, grain sorghum, and hay sorghum plantings; manuring, plowing, and subsoiling of all scheduled rotation plots; plowing of field C-6; threshing of grain sorghums and broom corn; cultivation of all nurseries and orchards; and frequent watering of all orchard trees planted during the past winter. Owing to the abandonment of the greater portion of the cotton on the station, and the long period of drouth which has held back the growth of weeds, it has been possible to operate with a relatively small force of laborers.

Tables showing yields obtained from grain sorghums, both in the rotations and in the variety test, and from rotation hay sorghums, are given below.

Milo Yields, Rotation and Tillage Experiments - 1928

Plot	Yield per Acre: Bushels	Rotation and cultural practices
A4-13	16.7	Milo, field peas, plowed spring; sorghum, plowed November; cotton, plowed fall; oats, plowed June.
A4-17	20.1	Milo, field peas for hay, plowed spring; sorghum, plowed Nov.; cotton, plowed fall; oats, plowed June.
A5- 2	19.9	Milo, plowed July; oats, plowed June; cotton, plowed Nov.
A5- 5	18.2	Milo, plowed July; oats, plowed June; cotton, manure, plowed Nov.
A5-10	19.4	Milo, plowed July; cotton, plowed fall; oats, plowed June; cotton, plowed Nov.
A5-14	21.6	Milo, manure, plowed July; cotton, plowed fall; oats, cowpeas, plowed fall; cotton, plowed Nov.
A5-18	23.4	Milo, manure, subsoiled July; cotton, plowed fall; oats, cowpeas, subsoiled fall; cotton, plowed Nov.
A6- 1	9.9	Milo, continuously, plowed July
A6- 2	2.9	Milo, manure, continuously, plowed July
A6- 5	12.5	Milo, plowed July; oats, plowed May
A6-13	19.3	Milo, plowed fall; corn, plowed July
B4-16	15.7	Milo, plowed July; Sudan grass, plowed Nov.; cotton, plowed Nov.
B4-19	18.0	Milo, field peas for hay, plowed spring; sorghum, plowed Nov.; cotton, plowed fall; oats, plowed June
B5-17	14.2	Milo, plowed July; cotton, plowed Nov.
Average	16.5	

San Antonio (cont'd)

Grain Sorghum Yields, Variety Test - 1928

Variety	C.I. No. or Source	Yield per acre (bu.) First plot	Second plot	Average
Dwarf Milo	332	13.6	11.1	12.4
Double Dwarf Milo	Woodward, Okla.	15.2	10.4	12.8
Dwarf Hybrid Straightneck Milo	" "	13.0	8.4	10.7
Dwarf Hybrid feterita	" "	18.2	13.2	15.7
Feterita	182	16.2	15.4	15.8
Spur feterita	623	12.6	8.9	10.8
Hegari	S.P.I. 34911	12.3	15.2	13.8
Smith milo x kafir	808	7.9	6.1	7.0
Chiltex	T.S. 8917	11.4	8.2	9.8
Reed Blackhull kafir	628	6.3	5.7	6.0
Texas Blackhull kafir	T.S. 9195	6.3	3.4	4.9
Sunrise kafir	472	11.3	7.1	9.2
Darso	Woodward, Okla.	7.5	6.6	7.1
Sumac	Local	9.8	8.3	9.1

Hay Sorghum Yields, Rotation and Tillage Experiments - 1928

Plot	Yield per acre (tons)	Rotation and Cultural Practice
- Drilled Sorgo -		
A4-14	1.84	Sorgo, plowed Nov.; cotton, plowed fall; oats (grain), plowed June; milo, field peas, plowed spring
A4-18	2.45	Do., except field peas harvested for hay
B4-12	3.61	Sorgo, manure all years, continuously cropped, plowed Nov.
B4-13	3.59	Sorgo, manure odd years, continuously cropped, plowed Nov.
B5- 6	3.15	Sorgo, continuously cropped
B5-11	4.46	Sorgo, plowed Nov.; cotton, plowed Nov.
B5-15	3.92	Sorgo, plowed Nov.; corn, plowed July
- Row Sorgo -		
A4-10	1.75	Sorgo, plowed Nov.; fallow
A6- 4	1.57	Sorgo, continuously cropped, plowed Nov.
B5- 5	2.38	Sorgo, continuously cropped, plowed Nov.
B5- 9	2.06	Sorgo, plowed Nov.; cotton, plowed Nov.
B5-13	1.96	Sorgo, plowed Nov.; corn, plowed Nov.
- Sudan Grass -	1st Crop / 2d Crop	
A6-17	2.28 / 2.50	Sudan grass, manure, plowed Nov.; corn, plowed July
B4-14	1.45 / .56	Sudan grass, plowed Nov.; corron, plowed Nov.; milo, plowed July

San Antonio (cont'd)

Station visitors during the period have included:

Mr. R. A. Hall, Superintendent, Texas Substation No. 1, Beeville, Texas, July 20.

Dr. D. C. Neal, Office of Vegetable and Forage Diseases, August 25.

Mr. Paul R. Dawson, Division of Soil Fertility Investigations, Bureau of Chemistry and Soils, August 29.

Geo. T. Ratliffe.

Scotts Bluff

The average maximum temperature for the week ending September 1 was 79, with a maximum of 84 on the 28th; the average minimum temperature was 46, with a minimum of 42 on the 25th. Precipitation for the week amounted to .19 inch.

The weather has been somewhat cooler the past week. All crops are showing good growth. Sugar beets and potatoes have been irrigated again.

The Annual Beet Tour of the Great Western Sugar Company was held on Friday and attended by about 200 farmers and business men. Interesting remarks were made by Mr. Frank Kemp, District Manager of the Great Western Sugar Company at Scottsbluff, Nebraska, and by Mr. A. H. Scilley, Manager of the Company at Longmont, Colorado. They arrived at the Experiment Farm at noon, at which time a lunch was served. In the afternoon the results of the different rotation experiments were explained by the Superintendent of the Station.

The average maximum temperature for the week ending September 8 was 82, with a maximum of 90 on the 7th; the average minimum temperature was 46, with a minimum of 40 on the 4th. No precipitation was recorded.

The weather has been cool most of the week.

The third crop of alfalfa has been cut and stacked. The irrigation water was cut off for several days because of a break in the ditch.

The average maximum temperature for the week ending September 15 was 78, with a maximum of 89 on the 13th; the average minimum temperature was 42, with a minimum of 36 on the 13th. Precipitation for the week was .20 inch.

The week has been favorable for growing crops. Sugar beets are being irrigated for the last time this season. Ensilage cutting will commence the first of next week.

James A. Holden.

MISCELLANEOUS

THE SURVEY OF IRRIGATION WATERS FOR BORON

On returning to California on July 10, the writer found that since the middle of April Mr. Wilcox, for the Limoneira Company, had been making a survey of the irrigation supplies of the Santa Clara Valley with a few samples from the area to the south in the Simi, Las Posas, and Santa Rosa Valleys.

In this survey 61 samples of water were collected and analyzed. The results may be summarized as follows:

(1) For the Santa Clara Valley above the confluence of the Piru there are two samples (several more since July 1 to be included). These show conductances of 153 and 136 (X 10^{-5}) with boron 49 and 46 parts per 100 million.
(2) For the area between the confluence of the Piru and that of the Sespe there are six samples having conductances ranging from 94 to 232 and boron from 35 to 162, the highest in boron being Piru Creek.
(3) For the area between the confluence of the Sespe and that of Santa Paula Creek there are eleven samples, of which four are consecutive from the intake of the Farmers' Ditch. These range in conductance from 85 to 150 and in boron from 17 to 171, the highest in boron being Sespe Creek.
(4) For the area between Santa Paula Creek and the delta of the Santa Clara River there are twenty samples (at least four more in new series to be included). These twenty range in conductance from 64 to 313 and in boron from 14 to 94. The lowest, both in conductance and in boron, is Santa Paula Creek above the junction of the Sisar.
(5) For the Bardsdale area there are eight samples, ranging in conductance from 27 to 263 and in boron from 6 to 128. The lowest in conductance and in boron is Dryden Spring in Grimes Canyon.
(6) For the Simi-Las Posas area, south of the Santa Clara Valley, there are six samples, ranging in conductance from 68 to 224 and in boron from 10 to 90. The lowest in both conductance and boron is a well in the hills about two miles south of Moorpark.

This survey shows that while it may be assumed that the Sespe and Piru contribute the major portion of the boron to the Santa Clara drainage basin, there is evidence of some other source that contributes to the Simi drainage.

This general survey of the area is being continued, but less intensively. Since July 1 only occasional samples are being collected, chiefly by Mr. Foote of the Limoneira Company in collaboration with Mr. Freeman. The analyses, as heretofore, are being made by Mr. Wilcox.

Beginning with July 1 attention has been chiefly directed to a study of the conditions found from week to week in samples taken from the more important irrigation supplies used in the Santa Clara Valley and in the San Fernando Valley, together with a series taken at the upper end of the Los Angeles Aqueduct. It is proposed to continue these weekly observations on the more important irrigation supplies throughout the season. These include for the San Fernando Valley: (1) The aqueduct at San Fernando Reservoir; (2) the city supply of the

Survey of Irrigation Waters for Boron (cont'd)

city of San Fernando; (3) the so-called Mission Wells that contribute to the aqueduct; and (4) the Lankershim Wells that also contribute to the aqueduct.

For the Santa Clara Valley we are collecting each week samples as follows: (1) Piru Creek, surface water at the diversion dam; (2) underground water from Warring's Well in Piru (domestic and irrigation); (3) Sespe Creek, surface water at the diversion dam; (4) underground water from the Brownstone Well; (5) composite in the Farmers' Ditch at the Renfro Box below the Reese Wells; (6) Thermal Belt water from the Limoneira Reservoir; (7) Delmar supply from the Delmar Reservoir.

For observing the situation at the upper end of the Los Angeles Aqueduct we are obtaining four samples at weekly intervals as follows: (1) From the aqueduct intake on Owens River near Aberdeen; (2) from the Alabama Gates at the lower end of the first 26 miles of open, unlined canal into which various springs and wells are discharging; (3) North Haiwee at the outfall of a 24-mile section of open but lined ditch into which one well and some mountain streams discharge; and (4) South Haiwee where, below the power house, we get a sample of the water that enters the upper end of the closed section of the aqueduct.

Survey of the Owens River Tributaries

During July 21 to 23 a survey was made by the writer, with Dr. W. P. Kelley, of the tributaries of the Owens River. Samples of water were collected to ascertain where boron occurs. It was found that boron was present in appreciable quantities in the upper sections of the aqueduct and in Owens River north of Bishop as well as in the drainage waters of the Bishop Valley. With one exception, the mountain streams entering the valley appeared to be free from boron. The exception was a stream known as Hot Creek in Long Valley. This creek at the point where it was sampled on July 23, about three miles north of Whitmore's Tub, showed a temperature of 33° C. (91° F.), a discharge of about 30 second-feet, and a boron content of about 2.25 parts per million (turmeric test). The indications are that the hot water and boron in this creek come from a series of geysers and hot springs which occur along its banks on the floor of the valley.

It is proposed to have Wilcox go over this valley this coming week to collect samples from the five or six creeks that constitute the headwaters of the Owens River, and particularly to sample Hot Creek above and below the geysers to obtain more precise information as to the conditions.

Survey of the Santa Clara Tributaries

It is proposed to proceed at once with a detailed survey of the tributaries of the Santa Clara Basin, with special emphasis on the Sespe and the Piru, in an attempt to locate the sources from which the boron is derived. Samples of water collected in the Soledad Canyon near Lang, and in the bed of the Santa Clara below Saugas, indicate that very little boron is contributed to the lower basin from above the San Francisquito and probably not from above the Piru. It is to be hoped that if the streams or springs from which the boron comes can be located, it may be possible to divert or withhold their waters and thus reduce materially the boron supply reaching the main drainage basin.

August 13, 1928. C. S. Scofield

CONDITIONS IN THE LOS ANGELES AQUEDUCT WITH RESPECT TO DISSOLVED SALTS AND BORON CONTENT AS OF JULY-AUGUST, 1928.

Introduction

In view of the fact that there is some evidence of symptoms of boron injury to lemons and walnuts in the San Fernando Valley, an investigation has been inaugurated to determine the quantity and character of the dissolved salts, including boron, in the aqueduct water in comparison with the underground waters as developed for the city of San Fernando and for the aqueduct at the San Fernando Mission and at Lankershim. Also, series of samples are being taken along the upper section of the aqueduct in Owens Valley, and surveys have been made of the salt and boron conditions in some of the more important tributaries to the aqueduct in Owens Valley and to Owens River in Long Valley. It is planned to continue a program of analyzing each week samples of water from the aqueduct at San Fernando and from three wells in the San Fernando Valley, as well as samples from four points along the upper aqueduct, viz.: The heading at Aberdeen, at Alabama Gates, at North Haiwee, and at South Haiwee.

In addition to this continuing program, two surveys have been made to learn the condition with respect to the salts and boron contained in the tributaries to the aqueduct in Owens Valley and in the tributaries to Owens River above the aqueduct heading. The first of these surveys was made by Kelley and Scofield July 21 to 23, 1928, and the second by Wilcox August 17 to 18, 1928. On the first survey only small samples of water were obtained; so that only qualitative determinations of the boron content could be made. On the second survey large samples were taken at the more significant points and quantitative determinations of boron were made.

In testing these samples of water the methods used have been: (1) The determination of specific conductance at 25° C.; (2) the titration of aliquots for the ions CO_3, HCO_3, and Cl; (3) the sulphate content on small samples was determined by the turbidity test, on large samples by the gravimetric method; (4) the quantity of alkaline-earth bases (calcium and magnesium) has been determined by the soap test; (5) the boron content on small samples has been estimated by the turmeric method, while on large samples the distillation method as developed by Wilcox has been used.

The results of the conductance test are reported as reciprocal ohms ($\times 10^{-5}$), from which the total quantity of dissolved electrolytes may be estimated by the use of the conversion factors given in Table 2/28. The quantitative boron determinations are reported in terms of milligrams of boron in 100 liters of water, or parts per 100 million, and are probably within 5 parts per 100 million of the truth. In the accompanying table (37/28) the results reported include only the specific conductance and the boron content as determined by the distillation method.

Conditions in the San Fernando Valley

The water of the aqueduct (discharge probably 375 second-feet) has been sampled seven times between July 6 and August 17. The conductance has ranged from 33.4 to 39.6, indicating a salt content of approximately 210 parts per million. The boron content has ranged from 58 to 75 parts per hundred million.

Conditions in the Los Angeles Aqueduct, etc. (cont'd)

The water supply of the city of San Fernando, as indicated by seven samples from Well No. 1 (discharge about 1.25 second-feet), shows a higher salt content than aqueduct water, about 300 parts per million; but the boron content is lower, ranging from 22 to 33 parts per hundred million. It may be noted in this connection that while lemons and walnuts grown in the San Fernando Valley with aqueduct water show the characteristic symptoms of boron injury, trees of the same species grown in the city of San Fernando do not show those symptoms.

The quality of the underground water of the San Fernando Valley, as indicated by samples from the Mission Well and one of the wells at Lankershim, is also shown in Table 37/28. The water from the Mission Well is essentially the same as that from Well No. 1 of the city of San Fernando, while the water from the Lankershim well contains less salt and less boron than either of the other wells.

Conditions at the Head of the Aqueduct

The series of samples obtained from the four points along the upper 50 miles of the aqueduct do not as yet cover a period long enough to show more than one significant fact, viz.: The boron contribution to the aqueduct supply probably originates chiefly above the heading at Aberdeen. The range of salt content and of boron content in these samples is substantially the same as that reported for the aqueduct at San Fernando. It is proposed to continue these observations along the upper section of the aqueduct throughout the coming winter.

The Surveys of Aqueduct Tributaries

The first survey of the tributaries to the aqueduct showed that there were two of these that were contributing substantial quantities of boron. The others appeared to contain only traces or negligible quantities. One of these boron sources is a well located a short distance ($\frac{1}{4}$ mile) south of the aqueduct heading at Aberdeen. This is a flowing well, said to yield about 0.6 second-feet of water. This water, reported as No. 90, contains about 3600 parts per million total salts and 928 parts per hundred million of boron. If it is assumed that these figures for discharge and for boron are correct, then it may be inferred that this well is contributing daily about 30 pounds of boron, or an equivalent of 260 pounds of borax, to the aqueduct supply.

The other apparently important source of boron was found in Long Valley. One of the creeks in this valley, Mammoth Creek, flows through an area where there are a number of hot springs or geysers. Below these geysers the creek is known as Hot Creek. Above the geysers the water of Mammoth Creek is cold and contains very little salt and mere traces of boron, as is shown by the analyses reported in Table 37/28 under laboratory Nos. 100 and 101. Below the geysers where the water is warm the salt content is appreciably higher (laboratory No. 98), about 350 parts per million, and the boron content was found to be 232 parts per hundred million.

The flow of Mammoth Creek above the geysers does not appear to be appreciably less than below them. It was estimated as 35 second-feet where the sample of Hot Creek was taken on August 17 at the road crossing

Conditions in the Los Angeles Aqueduct, etc. (cont'd)

north of Whitmore's Tub. If the estimate of the discharge of Hot Creek is approximately correct, and also the results of the boron determinations, then it may be assumed that the hot springs and geysers along Lower Mammoth Creek are contributing daily about 440 pounds of boron, which is equivalent to 3850 pounds of borax. It seems probable that a large part of this contribution finds its way into Owens River and ultimately into the aqueduct supply.

A superficial examination of the topography between Mammoth Creek above the geysers and Convict Creek, the next stream to the east, indicates that it might be feasible to divert Mammoth Creek into Convict Creek and thus isolate the hot springs which yield the boron.

With respect to conditions in Owens River above the junction of Hot Creek, a sample of water taken from the river near Ford's Ranch (lab. No. 99) showed a boron content of 41 parts per hundred million. While this is much less than was found in Hot Creek, it is on the other hand much more than was found in the other streams sampled in Long Valley. It remains to be determined by a later survey whether the boron found in Owens River at Ford's Ranch can be traced to other hot springs that may possibly be isolated or whether it comes from scattered areas of generally low concentrations.

Conclusions

The information at present available leads to the view that the water of the Los Angeles Aqueduct as it is delivered for irrigation in the San Fernando Valley contains enough boron to induce symptoms of injury in the leaves of lemon and walnut trees grown in that valley. These symptoms are much less pronounced than those that occur in sections of the Santa Clara Valley, particularly where waters from Sespe and Piru Creeks are used for irrigation. They are, however, sufficiently marked to cause some anxiety as to the future if the quantity of boron brought in by the aqueduct should continue undiminished.

A survey of the tributaries to the aqueduct in Owens and Long Valleys indicates that there are at least two sources of boron that might possibly be isolated and eliminated from the aqueduct supply without seriously reducing the volume of water. One of these is a flowing well near the aqueduct heading, and the other is a series of geysers and hot springs along Mammoth Creek in Long Valley. There remains to be located another source of boron along Owens River above Ford's Ranch.

Conditions in the Los Angeles Aqueduct, etc. (cont'd)

Table 37/28.- The conductance and boron content of the Los Angeles Aqueduct and some adjacent and contributing waters during July and August 1928. The conductance expressed as $K \times 10^{-5}$ at 25° C., and the boron as the element B in parts per 100 million. Analyses by Wilcox.

Date	Lab. No.	Conductance	Boron
	The Aqueduct Outfall at San Fernando Reservoir		
July 6	1	39.6	73
" 13	7	37.2	75
" 20	18	37.3	65
" 27	31	35.7	60
Aug. 3	45	33.4	67
" 10	62	33.7	70
" 17	82	36.4	58
	San Fernando City Well No. 1		
July 6	2	52.3	32
" 13	8	53.3	29
" 20	17	53.2	33
" 27	29	52.0	31
Aug. 3	47	48.8	35
" 10	64	51.1	22
" 17	84	52.8	24
	Mission Well No. 4, San Fernando		
July 27	30	64.0	31
Aug. 3	46	63.0	--
" 10	63	61.5	24
" 17	83	63.5	22
	Lankershim Well No. 5, San Fernando Valley		
July 27	28	36.0	11
Aug. 3	48	37.3	14
" 10	65	35.5	--
" 17	85	36.5	13
	Aqueduct Heading at Aberdeen, California		
Aug. 2	51	40.1	53
" 9	71	42.2	40
" 17	103	40.4	46
	Aqueduct at Alabama Gates, Lone Pine, Calif.		
Aug. 10	70	30.8	34
" 16	86	30.8	52
	Aqueduct at North Haiwee, Olancha, Calif.		
Aug. 2	49	29.6	47
" 9	68	32.7	31
" 16	87	32.3	37

Table 37/28 (cont'd)

Date	Lab. No.	Conductance	Boron
	Aqueduct at South Haiwee, Olancha, Calif.		
Aug. 2	50	34.9	76
" 9	67	31.7	58
" 16	88	32.8	54

The following analyses are of samples taken from tributaries to the aqueduct above the lined section:

	Artesian Well ½ mile south of heading at Aberdeen		
Aug. 16	90	489	928
	Fish Slough north of Bishop, Calif.		
Aug. 16	91	49	28
	Owens River above highest diversion for Bishop Valley		
Aug. 16	92	31.3	92
	Owens River below Tunnel Camp, Long Valley		
Aug. 17	93	37.1	100
	Hilton Creek at Highway, Long Valley		
Aug. 17	94	4.27	13
	McGee Creek at Highway, Long Valley		
Aug. 17	95	10.3	5
	Convict Creek at Highway, Long Valley		
Aug. 17	96	11.9	3
	Springs at Whitmore Tub, Long Valley		
Aug. 17	97	69.1	294
	Hot Creek at road crossing north of Whitmore Tub, Long Valley		
Aug. 17	98	59.1	232
	Owens River at Ford Ranch above junction of Hot Creek, Long Valley		
Aug. 17	99	21.1	41
	Mammoth Creek (Upper Hot Creek) at Highway, Long Valley		
Aug. 17	100	8.7	8
	Mammoth Creek four miles above Highway, Long Valley		
Aug. 17	101	9.7	2
	Drain in Bishop Valley four miles south of Bishop		
Aug. 18	102	31.9	38

August 31, 1928 C. S. Scofield

W E E K L Y R E P O R T S
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Belle Fourche

Under date of September 29 Mr. Aune reported as follows:

The first killing frost occurred on the 24th. Corn that was properly taken care of was ripe at that time.

The sugar factory started operations September 25. The prospects for a good beet crop are excellent. The estimated yield for the district is 12 tons an acre.

As a whole, the year has been favorable to all crops, and the conditions on the project are good. Some new settlers are coming in, and farms that have improvements with livable quarters are being taken up.

Beyer Aune.

Huntley

Report for the week ending September 29.

Climatic conditions during the latter part of the season were very favorable; and while the crop prospect earlier in the year was not promising, most crops have made excellent recovery and are returning normal yields.

The sugar beet harvest was begun on September 25; the estimated average yield is placed at 11 tons per acre for the project. The area on the project this year cropped to beets is slightly more than 2,500 acres, or less than half that of former seasons. The reduction in acreage resulted from failure of the Sugar Company and the Growers' Association to reach an agreement on the price to be paid for the season's crop. The price of $7.50 per ton (minimum) with possible additional payments, depending upon sugar content of beets and the selling price of sugar, is being paid. The total acreage in the Billings factory district is somewhat over 14,000 acres as compared to 24,000 acres in 1927.

The reduction in beet acreage was offset by a substantial increase in the acreage of Great Northern and garden beans. About 30,000 acres in Yellowstone County was cropped to beans this season. The harvest season has been especially favorable, and most of the crop has been sold at from $4.50 to $6.00 per hundredweight. The average yield on irrigated land will probably be about 1,500 pounds per acre for Great Northerns and about 1,000 pounds per acre for garden varieties. The contract price for garden beans (seed) was $5.50.

While conditions on dry lands adjacent to the project were not especially favorable, due to rainfall below normal, yields of winter wheat on fallowed land of from 15 to 30 bushels per acre were obtained.

Cooperative shipments of wool and lambs from farm flocks on the project, of which there are an increasingly large number, have brought very satisfactory returns.

Two farm tour meetings were held at the station during the season. The first of these was on July 17 when about 200 farmers from northern Montana projects and the Lower Yellowstone project spent the day in-

Huntley (cont'd)

specting the field crops and livestock work of the station. A beet growers' tour was held on September 18, at which time about 50 farmers from the Forsyth and Hysham districts visited the station.

At the annual project farmers' picnic on August 18 there was an attendance of about 1,500 people. A public hall, constructed this year by the Project Picnic Association in the park adjacent to the station buildings, was used for the first time on the occasion of the annual picnic. This building is of frame construction and is 40 by 80 feet in size. It will be used also for the Annual Project Fair and for other public meetings.

At the station, the harvest of all crops except beets and potatoes is completed. Yields of crops in the irrigated rotations and other experiments are given in the accompanying tables.

Yields of oats in the irrigated rotations in 1928

Rotation No.	Plot No.	Pounds per plot: Grain	Pounds per plot: Straw	Grain, bushels per acre	Ratio of grain to straw (pounds)
1	K- V-21	285	235	35.6	1 : 0.825
16	- 2	510	580	63.8	1 : 1.137
22	- 7	740	620	92.5	1 : 0.838
23	-15	828	762	103.5	1 : 0.920
24	-10	670	590	83.8	1 : 0.881
25	- IV- 5	1060	1080	132.5	1 : 1.019
27	- V-19	508	472	63.5	1 : 0.929
28	-18	455	585	56.9	1 : 1.286
30	- IV-15	630	570	78.8	1 : 0.905
31	- III-13	860	990	107.5	1 : 1.151
32	- IV-18	460	390	57.5	1 : 0.848
42	- 9	960	960	120.0	1 : 1.000
44	-14	1040	970	130.0	1 : 0.933
60	- III- 7	1100	1120	137.5	1 : 1.018
61	- 1	1040	1390	130.0	1 : 1.337
1-a	L- IV- 1	354	286	44.3	1 : 0.808
34	- 2	510	520	63.8	1 : 1.020
35	- 6	690	640	86.3	1 : 0.928
46	-10	1020	910	127.5	1 : 0.892
64	-15	870	780	108.8	1 : 0.897
69	-22	990	1010	123.8	1 : 1.020
Average		742	736	92.8	1 : 0.981

Huntley (cont'd)

Yields of wheat in the irrigated rotations in 1928

Rotation No.	Plot No.	Pounds per plot Grain	Pounds per plot Straw	Grain, bushels per acre	Ratio of grain to straw (pounds)
3	K- V- 23	290	320	19.3	1 : 1.103
18	- 3	531	529	35.4	1 : 0.996
28	- 17	343	307	22.9	1 : 0.895
37	L- I- 1	630	830	42.0	1 : 1.317
47	- 9	540	920	36.0	1 : 1.704
49	- 5	690	1200	46.0	1 : 1.739
Average		504	684	33.6	1 : 1.292

Yields of flax in the irrigated rotations in 1928

Rotation No.	Plot No.	Pounds per plot Grain	Pounds per plot Straw	Grain, bushels per acre	Ratio of grain to straw (pounds)
9	K- III-16	88	172	6.3	1 : 1.943
67	- II- 1	383	837	27.4	1 : 2.185
Average		236	505	16.9	1 : 2.064

Yields of alfalfa, first and second cuttings, plot variation test, Fields B-II and B-III, 1928.

Plot No.	First crop, Lbs. per plot	Second crop, Lbs. per plot	Plot No.	First crop, Lbs. per plot	Second crop, Lbs. per plot
B-II- 1	610	370	B-III- 1	690	610
- 2	540	440	- 2	630	550
- 3	530	420	- 3	620	610
- 4	550	440	- 4	620	600
- 5	550	440	- 5	660	580
- 6	490	400	- 6	600	570
- 7	500	440	- 7	640	660
- 8	500	540	- 8	660	580
- 9	520	500	- 9	600	560
-10	670	520	-10	610	550
-11	680	560	-11	750	590
-12	520	620	-12	860	670
-13	720	610	-13	870	620
-14	740	620	-14	810	550
-15	780	600	-15	790	590
-16	690	640	-16	790	550
-17	640	640	-17	720	550
-18	670	560	-18	760	510
-19	670	690	-19	810	680
-20	690	640	-20	840	640
-21	680	570	-21	780	590
-22	730	570	-22	800	630
-23	660	510	-23	760	640

Huntley (cont'd)

Yields of silage corn, variety Payne White Dent, Field L-III, in 1928

Plot No.	Yield	
	Plot, lbs.	Acre, tons
L- III- 1	6,920	13.84
- 2	6,950	13.90
- 3	7,010	14.02
- 4	7,980	15.96
- 5	7,790	15.58
- 6	7,730	15.46
- 7	6,940	13.88
- 8	7,140	14.28
- 9	6,210	12.42
-10	6,690	13.38
-11	6,020	12.04
-12	5,840	11.68
-13	5,840	11.68
-14	6,220	12.44
-15	6,100	12.20
-16	6,880	13.76
-17	6,630	13.26
-18	6,220	12.44
-19	6,640	13.28
-20	7,090	14.18
-21	7,040	14.08
-22	7,330	14.66
-23	6,900	13.80
-24	7,450	14.90
Average	6,815	13.63

Yields of wheat in variety test, Field O, 1928
(each plot 1/8th acre in size)

Plot No.	Variety	Pounds per plot		Grain, bushels per acre	Ratio of grain to straw (pounds)
		Grain	Straw		
O-III-1-a	Supreme	262	248	34.9	1 : 0.946
-b	Marquis	298	402	39.7	1 : 1.349
-2-a	Pringle Champlain	324	366	43.2	1 : 1.130
-b	Supreme	342	358	45.6	1 : 1.047
-3-a	Marquis	329	341	43.9	1 : 1.036
-b	Pringle Champlain	384	506	51.2	1 : 1.318
Average of 2 plots	Supreme	302	303	40.3	1 : 0.997
2 "	Marquis	314	372	41.8	1 : 1.193
2 "	Pringle Champlain	354	436	47.2	1 : 1.224

Huntley (cont'd)

Yields of barley in Field C and of oats in L-I and L-IV triangles in Field O

Field	Pounds per plot		Grain, bushels per acre	Ratio of grain to straw (pounds)
	Grain	Straw		
C	19,750	16,790	68.6	1 : 0.850
L-I- Tri.	2,300	2,690	130.7	1 : 1.170
L-IV-Tri.	1,800	1,700	97.0	1 : 0.944
O- I-1	1,030	1,220	128.8	1 : 1.844
O- I-2	1,000	1,160	125.0	1 : 1.160
O-III-8	1,130	1,230	141.3	1 : 1.089
-9	1,080	1,240	135.0	1 : 1.148
-10	1,030	1,290	128.8	1 : 1.252
-11	990	1,330	123.8	1 : 1.343

Dan Hansen.

Prosser

During the week ending September 29 the second cutting of alfalfa was harvested from the basin plots which are being used for soil-water-relations studies. The yields are not yet recorded on account of the slowness of curing. There is a good stand on these plots, however, and the alfalfa has made good growth since the first cutting. Harvesting of corn and potato plots in the irrigation experiment is also in progress.

A collection of drainage water samples were obtained from the Wapato Project during the week and electrical bridge readings made on them. All of these samples are running very low in total salts.

The dairy herd on the Station at the present time consists of 17 head. This herd is being used in pasture experiments with different varieties of sweet clover, Ladino clover, and mixed grasses. The average daily production of milk during the week was 34 pounds, the average maximum was 53 pounds, and the average minimum was 17.3 pounds.

Sixty-one head of hogs were marketed from the Station during the week at Yakima. They were delivered by truck in five loads; the average weight was about 170 pounds, and the price was from 10.75 to 12.75 cents per pound.

A potato growers' meeting was held at Sunnyside during the week in cooperation with the Sunnyside Chamber of Commerce. A movement was started to get the growers on the project to sell only U.S. No. 1 potatoes this year and hold the balance of the crop for feeding or a later market.

During the week ending October 6 the potato plots in the irrigation experiments were harvested. The yields from the various plots together with the irrigation treatments of each are given in the accompanying table.

Prosser (cont'd)

Irrigation Experiment With Potatoes--1928

Plot No.	Time of irrigation run	Number of irrigations	Amount water applied: Each irrigation	Amount water applied: During season	Yield in tons per acre: No. 1's	Yield in tons per acre: Total
	Hours		Inches	Inches		
1	4	9	1.1	9.9	7.6	14.9
2	8	9	2.2	19.8	12.2	15.5
3	12	9	3.3	29.7	9.2	14.4
4	16	9	4.4	37.6	5.3	11.2
5	20	9	5.5	49.5	9.8	13.0
6	24	9	6.6	59.4	8.9	13.9
7	24	10	6.6	66.0	10.0	15.1
8	24	11	6.6	72.6	3.7	10.4
1A	4	9	1.1	9.9	10.6	14.2
2A	8	9	2.2	19.8	10.2	14.2
3A	12	9	3.3	29.7	8.6	13.1
4A	16	9	4.4	37.6	8.5	12.2
5A	20	9	5.5	49.5	9.4	12.7
6A	24	9	6.6	59.4	10.2	14.2
7A	24	10	6.6	66.0	6.5	12.4
8A	24	11	6.6	72.6	8.4	14.4

First irrigation before planting, May 22, 7.7 acre-inches per acre. Potatoes planted May 24. Plots 8 and 8A irrigated June 15 and 25. Plots 7 and 7A irrigated June 20. Regular schedule started July 5. All plots irrigated once a week (every 7 days) for 9 weeks until August 30. Plots dug on September 28 and 29.
Land for above crop prepared as follows: 1. Manured, approximately 15 tons per acre. 2. Disked. 3. Irrigated. 4. Plowed. 5. Planted with machine planter, 9 inches between hills.

One silo was filled during the week and the other one was partially filled with corn ensilage. Two carloads of potatoes were hauled from the cold storage plant at Grandview. These potatoes are last year's crop and are being disposed of for the cost of hauling. Those procured by the Station are being fed to the dairy cows. Each cow is eating approximately 50 pounds per day and also 25 to 30 pounds of hay and an allowance of from one to six pounds of grain. A noticeable increase in milk has already resulted from this potato feeding.

Water is still being delivered from the Sunnyside Canal. The farmers are using it mostly for fall irrigation of alfalfa and new seeding as well as for a few small areas of winter wheat.

C. C. Wright.

San Antonio

Report for September.

Rainfall during September amounted to 4.97 inches--2.21 inches above normal for the last 22 years. While some torrential showers of short duration enter into this total, a large percentage came in the form of slow, penetrating rain. Temperatures were subnormal throughout the month, the mean of 76.9 being 2.8 degrees below the average mean for the month during the preceding 21 years. The absolute maximum--94 degrees--is the lowest absolute maximum recorded for September during the last 22

San Antonio (cont'd)

years. Wind movement was also somewhat below normal for the month. The combination of subnormal temperatures and wind movement resulted in an evaporation from a free-water surface of only 4.92 inches, a deficiency of 1.91 inches.

The September rains were of no value to the cotton crop of the region but were of tremendous value to meadows, pastures, and land to be used for winter crops. Hay crops renewed growth where not completely killed out by the preceding drouth but mostly are heading very short. Some open cotton was caught in the field by the rains, but by the end of the month practically all picking and ginning in the county had been completed. Unofficial estimates are that about three-fifths of a normal crop was harvested. Damage from rootrot has been quite spotted, large dead areas appearing in a few fields but in the majority of cases occurring in small areas scattered throughout the fields.

A summary of the meteorological data recorded at the station during September follows:

Week ending	Temperature (degrees F.)					G. D. R.	Precip-itation (inches)	Sky (days)		
	Maximum		Minimum		Mean			Clear	Partly cloudy	Cloudy
	Abso-lute	Mean	Abso-lute	Mean						
Sept.8	94	90.3	61	67.0	78.6	29	.97	3	2	2
" 15	94	91.7	71	73.3	82.5	23	.41	0	6	1
" 22	94	85.4	59	64.0	74.7	30	3.47	4	1	2
" 29	90	77.0	60	64.3	70.6	22	.10	1	1	5
Month of Sept.	94	86.5	59	67.2	76.9	30	4.97	10	10	10

Station work accomplished included cultivation of cotton, sorgo, and all orchards and nurseries; shelling all corn except the moisture determination samples; plowing field AB-8 and a portion of C-3; repair of greenhouse plumbing; and repair of pasture fences.

Messrs. Boyd and Douglas of the Office of Cereal Insect Investigations, Bureau of Entomology, stationed at Beaumont, Texas, and New Orleans, Louisiana, respectively, were station visitors September 10.

Though maximum temperatures were not excessive and there was no precipitation during the week ending October 6, several days were uncomfortably sultry. The absolute maximum was 93, average maximum 92.0; absolute minimum 64, average minimum 69.7; mean temperature for the week 80.9. Five days were partly cloudy and two were clear.

As the fields were too wet for plowing the early part of the week, the laborers did miscellaneous repair jobs and hauled the winter's supply of wood. During the latter part of the week the plowing of Field C-3 was completed; rotation plots were prepared for planting field peas; orchards, nurseries, and gardens were cultivated; and the third crop of Sudan grass in the rotations was mowed.

Geo. T. Ratliffe.

Scotts Bluff

The average maximum temperature for the week ending September 22 was 80, with a maximum of 86 on the 16th; the average minimum temperature was 41, with a minimum of 32 on the 21st. Precipitation for the week was .04 inch.

The weather has been quite cool most of this week. A rain on the 20th lowered temperatures, and the following night there was a white frost, which destroyed the leaves of garden vegetables but did no damage to crops in the ground.

The three silos at the station have been filled with a very good grade of silage.

The average maximum temperature for the week ending September 29 was 68, with a maximum of 80 on the 29th; the average minimum temperature was 39, with a minimum of 31 on the 27th. No precipitation was recorded.

The weather has been cool most of the week. A light freeze occurred on the night of the 26th; it did no damage to crops but helped to mature vines of potatoes so that digging can be facilitated. Late potatoes are about ready to dig.

The harvesting of sugar beets in the Valley will commence October 1 with a prospect for a heavy tonnage.

James A. Holden.

Umatilla

Mr. Dean makes the following report of progress during the summer under date of September 24:

Conditions on the project are generally good. The hay crops were better than they have been for a number of years, due principally to very favorable weather conditions. There was a very bad market for early potatoes, and a considerable percentage of them was left in the ground. The asparagus crop was good and it brought fair prices.

The Oregon Station and the Office of Vegetable Diseases of the Department have had a man here this summer working on the curly-top disease on truck crops other than beets and on flowers. In all about 200 varieties were tested for resistance. While a large percentage of them were killed, the fact that a local strain of squash has proved extremely resistant gives encouragement that resistant strains will be found in other species. The results have shown relative resistance on many varieties. For instance, while cucumbers and cantaloupes have many plants with some disease, they were able to mature crops. This work will be continued another year.

H. K. Dean.

Yuma

Mr. Noble returned to Bard September 14 from a trip to Huntley, Montana. On this trip he visited the field stations at Newell, South Dakota; Huntley, Montana; Prosser, Washington; Hermiston, Oregon; and Fallon, Nevada, as well as the State Experiment Stations at Logan, Utah, and Bozeman, Montana.

C.S.S.

W E E K L Y R E P O R T S

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Huntley

For the week ending October 13 the maximum temperature was 80, the minimum 23, and the precipitation 1.03 inches.

A rainfall of 1.03 inches on October 10 and 11 was the largest amount to occur at one time since early summer and will be of much benefit to winter grains and in making it possible to do fall plowing. The harvest of sugar beets on the project, which was about one-fourth completed, was delayed several days by this rainfall. Bean threshing on the project was not entirely finished, although in most cases beans not threshed have been stacked. The price of beans continues at 5½¢ to 6¢ per pound.

At the station the harvest of sugar beets and potatoes was completed during the week. Yields of these crops are given in the accompanying tables.

Yield of sugar beets in 1928, irrigated rotation experiments

Rotation No.	Plot No.	Stand, plants per acre	Pounds per plot	Tons per Acre	Sugar content, per cent
2-A	K- V- 22	21,056	3,861	7.72	19.0
10	II- 7	21,280	8,303	16.61	13.4
18	V- 4	18,560	663	1.33	16.8
20	- 6	21,728	5,520	11.04	20.0
21	- 14	23,520	8,370	16.74	17.0
22	- 8	23,744	2,411	4.82	17.9
23	- 16	21,504	7,116	14.23	18.7
30	IV- 16	22,848	3,020	6.04	16.5
31	III- 14	23,520	8,575	17.15	16.4
32	IV- 19	24,640	3,910	7.82	17.5
40	- 4	22,400	6,897	13.79	18.0
42	- 10	19,712	5,277	10.55	15.7
60	III- 8	20,608	5,753	11.51	17.0
61	- 2	21,728	9,706	19.40	13.1
67	II- 2	22,176	8,918	17.84	17.7
2-AA	L- IV- 5	21,504	3,434	6.87	18.3
34	- 3	21,120	2,176	4.35	16.7
35	- 7	23,808	6,449	12.90	17.7
46	- 11	19,264	1,574	3.15	15.5
64	- 16	20,736	5,597	11.19	17.6
37	L- I- 2	23,520	7,075	14.15	18.7
47	- 10	19,968	6,165	12.33	17.4
49	- 6	23,040	7,719	15.44	18.7
49	- 7	16,512	6,890	13.78	18.0

Huntley (cont'd)

Yields of potatoes in 1928

Rotation No.	Plot No.	Stand, plants per acre	Pounds per plot	Bushels per acre	Per cent marketable
4-a	K- IV- 21	17,552	1,680	112.0	82
20	- V- 5	18,176	1,130	75.3	81
21	- 13	20,736	3,540	236.0	86
24	- 9	20,224	1,600	106.6	84
25	- IV- 6	20,480	3,500	233.3	86
26	- V- 11	19,712	1,930	128.6	80
27	- 20	12,032	1,810	120.6	77
30	- IV- 17	18,944	1,840	122.6	79
31	- III- 15	20,736	2,800	186.6	83
40	- IV- 3	20,224	2,940	196.0	92
44	- 13	19,456	2,880	192.0	90
60	- III- 12	22,016	3,820	254.6	88
61	- 6	20,480	4,090	272.6	89
4-aa	L- IV- 9	17,056	2,330	155.3	78
34	- 4	16,432	2,000	133.3	77
35	- 8	16,016	4,240	282.6	84
64	- 17	14,144	4,020	268.0	91
	O- I- 7	20,384	7,390	492.6	92
	- II- 11a	21,216	2,900	386.6	85
	- b		3,550	473.3	89
	- IV- 1a	17,056	2,130	284.0	90
	- b		1,610	214.6	73

Plot O-I-7 maximum production series.

Plot O-II-11b treated with ammonium sulphate at rate of 400 pounds per acre, while plot O-II-11a, as check, was not treated.

Yields of sugar beets, Field O, 1928.

Plot No.	Stand, plants per acre	Pounds per plot	Tons per acre	Sugar content, per cent
O- I- 8	23,040	10,998	22.00	19.4
- II-10-a	21,504	3,395	13.58	18.0
-b		4,199	16.80	18.5
- IV- 2-a	23,232	4,090	16.36	18.3
-b		4,493	17.97	19.0

Plot O-I-8 in maximum crop series.

Plot O-II-10-b treated with ammonium sulphate at 400 pounds per acre. Plot O-II-10-a, as check, not treated.

Plot O-IV-2-b treated in 1927 with ammonium sulphate at 400 pounds per acre and cropped that year to potatoes. Plot O-IV-2-a, as check, not treated. Neither plot treated for 1928 beet crop.

Dan Hansen.

Prosser

Some trouble was experienced during the week ending October 13 in feeding last year's potatoes to the dairy cows. Several cases of severe indigestion and bloat occurred. It is thought that overfeeding and sprouts on the tubers are the cause of the trouble. More will be reported of this disturbance later.

The first killing frost of the season occurred on October 10 when the temperature was 31 degrees. There has been a frost-free period this season of 160 days.

The delivery of irrigation water to the Prosser Irrigation District has almost ceased for this year. A few farmers are still receiving enough for stock and here and there a little is being used for fall irrigation. The Experiment Farm has received so far this year 760 acre-feet, amounting to 3.33 acre-feet per acre. This is the largest delivery that has ever been made to the Station, and the irrigation season of 180 days has been one of the shortest. This is chiefly due to modifications and repairs made to the district pump, which have resulted in its increased efficiency.

Harvesting of the third cutting of alfalfa is now in progress on the station. About half of the crop was put in the stack during the latter part of the week. This is somewhat late for the third cutting, but as yet no difficulty has been experienced in curing the hay.

Several local fairs were held on the project and in the vicinity during the week. The grain, vegetable, and livestock judging were done by the specialists of this station. The quality and number of exhibits shown at these fairs each year seem to be increasing.

Farm work during the week ending October 30 consisted of harvesting the third cutting of alfalfa and husking corn from the fields.

A dairy show was held at Sunnyside during the week. It was fostered by the Sunnyside Commercial Club for the purpose of creating and stimulating an interest in dairying in the Lower Valley. Mr. M. D. Scroggs, Superintendent of the Sunnyside Division of the Yakima Project, is president of the Association formed to promote the enterprise. He said, "It is primarily a farmers', not a breeders', show."

Various exhibits of purebred and grade cattle were shown. Lectures and informal talks were given by college representatives and leading dairymen of the valley.

Alfalfa was harvested during the week on the plots in the "Frequency of Irrigation" experiment. This experiment has been running four years, and the yields for each year are given in the accompanying table. The results indicate that alfalfa should receive ordinarily more than four irrigations during the season.

Prosser (cont'd)

Yields of field-dry alfalfa hay in irrigation experiment, 1925-1928, inclusive.

Year	Yields in tons per acre							
	Plots							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1925	6.00	5.52	5.40	6.00	4.72	5.32	4.48	5.13
1926	7.02	6.40	6.20	6.53	6.54	6.20	5.02	4.40
1927	4.95	4.86	5.23	6.00	5.57	4.49	4.51	4.34
1928	3.92	4.29	4.80	4.78	5.20	4.43	4.14	4.02
Total	21.89	21.07	21.63	23.31	22.03	20.44	18.15	17.89
Yearly average	5.47	5.27	5.40	5.82	5.50	5.11	4.54	4.47

Note: Each plot received a net application of 3 acre-feet of water per acre during the season. The interval between irrigations was as follows:

Plots 1 and 2 were irrigated every 14 days, total 10 irrigations
Plots 3 and 4 were irrigated every 21 days, total 7 irrigations
Plots 5 and 6 were irrigated every 30 days, total 5 irrigations
Plots 7 and 8 were irrigated every 42 days, total 4 irrigations.

C. C. Wright.

San Antonio

The maximum temperature for the week ending October 13 was 92, minimum 62, greatest daily range 27, and mean temperature for the period 79.8°. Three days were clear and four were partly cloudy. There was no precipitation.

Station activities included plowing and disking on Field D-3; mowing Johnson grass and weeds on the waste areas of Fields A-3, B-3, E-3, and miscellaneous rotation plots, planting field peas for green manure on rotation plots; removing dead trees from orchards; and care of grounds and garden.

An unusually large flight of Southern Snout-butterflies (Libythea carinenta, Cramer), which started about the first of October, continued to pass this section until the latter part of the week. They were traveling in an east-north-east direction. So far as is known to the writer, this insect is of no economic importance. A similar migration of this same species occurred in this region in 1925.

Cotton leaf worms (Alabama argillacea, Hubner) appeared in a rather general infestation throughout this section during the week. Because of the lateness of the season, however, no attempt will be made to control them.

The week ending October 20 was slightly cooler than normal for the season. The maximum temperature was 88, minimum 47, greatest daily range 30, and mean for the week 69.3°. A penetrating rain of 1.42 inches

San Antonio (cont'd)

occurred on the 16th. Five days were clear and two were partly cloudy.

Rain on Tuesday followed by cool, non-drying days and exceptionally heavy dews every night made field work impracticable during the greater part of the week. Johnson grass has thrived under the conditions pertaining since the last of August and has gained a discouraging advantage on the station.

Reglazing the greenhouse roof, in anticipation of the inauguration of some very interesting experiments with the causal organism of cotton rootrot in cooperation with Dr. D. C. Neal of the Office of Vegetable and Forage Diseases, was started during the week.

The cotton produced by Kekchi selections was picked. Only a few of the strains recovered sufficiently from the hail damage of June 10 to produce a small number of bolls. No cotton will be picked from other station plantings. Owing to damage from boll weevils and drought, this year's crop in this county (Bexar) is only about three-fifths of normal. Last year the cotton crop was only about one-third of normal.

Geo. T. Ratliffe.

Umatilla

During the week ending September 29 the maximum temperature was 86 and the minimum 36. There was no precipitation.

The curly-top investigation, conducted in cooperation with the Office of Truck Crop Diseases and the Oregon Station, was completed for the season. One hundred per cent resistance was found in a variety of squash and of beans. A number of other varieties of the 200 crops tested were found resistant enough to produce fairly satisfactory crops. This work was in direct charge of R. F. Wilber, an agent of the Truck Crop Disease Office.

A carload of crossbred and black face lambs has been secured for the winter feeding work. The feed lots were fenced during the week. The lots this winter will be located on Field A-4, which has been in alfalfa for ten years. It has been the practice to feed each year on pieces of land ready to work out of alfalfa. This method completely eradicates the alfalfa and puts the land in splendid condition for subsequent cropping.

The men were laid off until winter feeding starts.

The maximum temperature was 77 and the minimum 33 during the week ending October 6. There was a rain of .06 inch.

The Umatilla Project Fair was held during the week. There were more exhibits and a larger attendance than ever before. Considerable time was taken in preparing and attending a booth in the Agricultural Building devoted to the work of the Station.

During the week ending October 13 the maximum temperature reached 86 and the minimum was 18. There was no precipitation.

The first frost this fall occurred during the week. The minimum temperature of 18 on the 12th did comparatively little damage except to apples still on the trees as the growing season was practically over.

The writer assisted in a farm management tour of the project staged by the Assistant County Agent. On the six farms visited special attention was given to pastures, silage crops, and farm flocks of sheep.

H. K. Dean

W E E K L Y R E P O R T S
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Huntley

During the week ending November 3 the maximum temperature was 46, the minimum 10, and the precipitation .11 of an inch.

Weather conditions continued favorable for field work during most of the week. Beet harvest on the project is nearing completion. The average yield of about 10 tons per acre is somewhat below earlier estimates.

Bean threshing was resumed following a delay of 10 days due to stormy weather. The price held at $5.85 per hundredweight.

More than the usual amount of fall plowing is being done on the project.

The first shipments of feeder lambs were received. These lambs are either taken in at 10 and 11 cents in outright sale or are being fed on contract for the owners.

At the station, plowing was the principal field work during the week.

Dan Hansen.

Prosser

Farm work on the station during the week ending October 27 consisted principally of husking seed corn. A selection of Reed's Yellow Dent seems to be one of the best varieties for this part of the country, and the station hopes to be able to supply and to increase the demand for it in the valley.

Plans were made during the week to feed about 50 head of beef cattle on the station during the winter. They will be divided into lots and given different rations, including corn silage, potatoes, alfalfa hay, and grain. These fifty head, besides the dairy stock and work stock on the farm, will probably consume all of the feed crops produced on the station this year.

About 1400 boxes of apples were sold from the 6-acre experimental orchard this year. The orchard is now six years old. This is the first year it has borne. The fruit is generally of high grade, especially the variety of delicious apples.

A meeting of the Federal Mens' Business Association was held at Sunnyside during the week. About forty members from the valley were present. The chief discussions were concerned with the establishment of the new U. S. weather station at Yakima, which is now in progress; the National Federation of Federal Employees; and irrigation investigations on Government reclamation projects with particular reference to the Yakima Valley.

Considerable laboratory work was done during the week ending October 10 on local soil samples taken at different depths. Several methods of preparing these samples for electrical-conductance determinations were tried and compared. It is planned to accumulate a fairly large number of conductance determinations on different soil profiles:

Prosser (cont'd)

those which have been irrigated for 30 to 40 years, those which have been irrigated only a few years, and those which have not been irrigated at all.

Fifty-two head of feeder cows were purchased at Lewiston, Idaho, and brought to the station during the week. They cost the station $67.50 per head. They are to be fed alfalfa hay, corn ensilage, and potatoes during the winter, and will be sold on the market in the early spring.

Farm work consisted chiefly of building a potato-cellar and digging potatoes. Harvesting of potatoes on the farm was completed.

C. C. Wright.

San Antonio

The maximum temperature for the week ending October 27 was 86, the minimum 42, the mean 66.6, and the greatest daily range 33. Five days were clear, two were partly cloudy, and there was .06 of an inch of precipitation. Heavy dews were deposited every night, and with the cooler-than-normal weather the curing of Johnson grass and sorgo hays harvested during the week progressed very slowly. Field work was stressed throughout the week.

Mr. H. E. Rea, Agronomist in cotton rootrot investigations of the Texas Agricultural Experiment Station with headquarters at Temple, Texas (Substation No. 5), was a station visitor on October 24.

During the week ending November 3 the maximum temperature was 84, the mean maximum 73.1; the minimum temperature was 39, the mean minimum 47.6; and the mean for the week was 60.4. The sky was clear two days, cloudy two days, and partly cloudy three days. A precipitation of .01 of an inch was recorded.

The first half of the month of October was warm, mostly clear, and without rainfall. A good growth of hay crops (Johnson grass and sorgos) followed the rains of September. These crops were being cut when a soaking rain occurred October 15-16. This was followed by subnormal temperatures, heavy dews, and cloudy mornings, and much of the down hay was either ruined or badly damaged. The harvest of the remainder of the crop had been resumed by the close of the month.

Small grains planted prior to the middle of October are up to good stands and are making good growth. Preparation of land for November planting was getting under way by the close of this week.

Visitors during the week included Mr. J. E. Morrow, Superintendent of the Plant Introduction Gardens, Chico, California, on November 2, and Dr. D. C. Neal, Plant Pathologist, Vegetable and Forage Crop Diseases, on November 2 and 3.

A slow, penetrating rain of 1.58 inches occurred during the first three days of the week ending November 10. Temperatures remained relatively low and with mostly cloudy weather the humidity was high. Hay crops cut the preceding week suffered severely and were still in the swath or windrow at the end of this week. No field work has been possible, and farm labor has been used on the repair of the greenhouse and care of grounds.

San Antonio (cont'd)

The maximum temperature was 79, minimum 44, greatest daily range 25; mean 61.6. The sky was clear two days, cloudy three, and partly cloudy two. The precipitation was 1.58 inches.

Geo. T. Ratliffe.

Yuma

During the two-week period ending November 10 the maximum temperature was 94, the minimum 38, and the precipitation .22 of an inch. The short thunder shower of October 30, during which .22 of an inch of rain fell, was the first time since March 3 that a measurable amount of precipitation has been recorded at the station. The total amount of rainfall recorded so far this year amounts to only .46 of an inch.

The weather has been very favorable for the harvesting of the project crops.

Cotton picking is about two-thirds completed. Nearly 20,000 bales from approximately 33,000 acres have already been ginned. As no frost has yet occurred in this region this fall, prospects are encouraging for a good top-crop of cotton. The average yield per acre may be nearly a bale when the final ginnings are posted.

Cotton lint is selling around 19 cents a pound and seed at $27.00 to $30.00 per ton. Fourteen gins are operating on the project. The charge for ginning ranges from 25 cents to 35 cents per hundredweight. Picking prices have averaged $1.50 per hundred pounds.

The harvesting of grain sorghums and alfalfa hay and preparing land for the planting of lettuce are the principal agricultural activities on the project in addition to the cotton picking.

Station work performed during the past two weeks has included the picking of cotton on the rotations and cooperative series; harvesting grain sorghums and corn; plowing and leveling plots for seeding to winter grains; cleaning ditches and repairing the irrigation system.

Station visitors included Mr. and Mrs. C. S. Scofield, Frank A. Thackery, and Prof. S. C. Mason.

E. G. Noble.

W E E K L Y R E P O R T S
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Limoneira Laboratory

During the two weeks ending November 24 the work of the laboratory has been chiefly the analyses of water samples in connection with a survey of the sources of the boron that occurs in certain irrigation supplies. Through the cooperation of the local forester a series of samples along Sespe Creek has been obtained. These indicate that the chief sources of boron in this stream are at Willett Warm Springs and at Sespe Hot Springs. The Sespe above Willett Spring shows very little boron.

The writer made a trip to Lockwood Valley on the Upper Piru and found that both Seymour and Lockwood Creeks, which drain that valley, contain approximately 2 parts per million of boron. Lockwood Valley is the locality where colemanite was formerly mined as a source of borax.

A survey in the direction of Santa Barbara resulted in discovering the fact that the Parida Creek, near Carpinteria, contains boron in amounts ranging from 5 to 8 parts per million. One spring tributary to Parida Creek showed 17.3 parts per million of boron.

Samples of water from Lake Elsinore and from the city wells that supply the town of Elsinore showed 1.44 and 0.8 parts per million of boron, respectively.

A series of 12 samples of water taken weekly from the Colorado River at Yuma have shown boron in amounts ranging from 0.15 to 0.34 parts per million, which is believed to be below the danger limit.

The work of the laboratory is progressing satisfactorily. The equipment is all in hand and nearly all installed. Since the first of July 425 samples of irrigation waters have been tested for boron and salts, and 38 leaf samples have been tested for boron.

C. S. Scofield.

During the two-week period ending December 8 a study has been made of the data we have in hand. Mr. Scofield has prepared a series of tables, of which three are included herewith.

Table 51/28 presents our findings on water samples from the upper end of the Los Angeles Aqueduct. The water from Owens River is diverted at the Heading located southeast of Aberdeen, California. It flowss from this point a distance of about 25 miles in an open, unlined canal to Alabama Gates. A large number of wells located along this section of the aqueduct may be pumped into the aqueduct as necessary. These pumps are run during the summer months. From Alabama Gates the aqueduct continues as an open, cement-lined canal to North Haiwee, a distance of 25 miles. Several small creeks feed this section. At North Haiwee the water discharges into Haiwee Reservoir. At South Haiwee the reservoir water enters the closed section of the aqueduct. The discharge at this point is 300 to 400 second-feet.

Limoneira Laboratory (cont'd)

Table 51/28.- Comparison of the water at points on the Los Angeles Aqueduct with respect to specific conductance and boron content. The specific conductance is expressed as K or reciprocal ohms x 10^{-5} at 25° C., and the boron as parts per hundred million.--C.S.S.

Date 1928	Heading		Alabama Gates		North Haiwee		South Haiwee	
	K	B	K	B	K	B	K	B
Aug. 2	40.1	53	---	--	29.6	47	34.9	76
9	42.2	40	30.8	34	32.7	31	31.7	58
17	40.4	46	30.8	52	32.3	37	32.8	54
23	40.7	42	32.7	33	31.2	38	33.5	66
30	44.0	52	33.8	37	30.5	42	37.2	75
Sept. 6	44.5	42	35.4	37	43.4	108	35.2	77
13	48.3	59	30.6	33	30.6	38.	38.7	69
20	43.1	60	35.8	58	31.7	45	33.9	51
27	40.0	65	34.1	57	32.5	46	39.6	58
Oct. 4	40.6	76	----	61	34.8	76	36.6	73
11	33.2	67	33.8	61	32.8	59	34.8	--
18	37.0	89	32.8	58	32.2	61	37.4	62
25	38.2	78	33.4	75	33.0	59	35.3	63
Nov. 1	36.9	76	35.0	55	32.7	68	38.9	63
8	36.0	80	32.6	53	33.3	96	35.6	63
15	37.2	81	38.0	--	36.0	78	----	--
Mean	40.1*	63	33.5	50	33.1	58	35.7	65

*Equivalent to 230 parts per million total salts.

Limoneira Laboratory (cont'd)

Table 49/28 compares the aqueduct water at the San Fernando outfall with underground waters of the San Fernando Valley.

Table 49/28.- Comparison of aqueduct water with that from San Fernando city well No. 1, Mission well No. 2, and Lankershim well No. 5, with respect to specific conductance and boron. The specific conductance is expressed as K or reciprocal ohms x 10^{-5} at 25° C., and the boron in parts per 100 million.--C.S.S

Date 1928	San Fernando aqueduct		San Fernando city well No. 1		Mission well No. 2		Lankershim well No. 5	
	K	B	K	B	K	B	K	B
July 6	39.6	73	52.3	32	----	--	----	--
13	37.2	75	53.3	29	----	--	----	--
20	37.3	65	53.2	33	----	--	----	--
27	35.7	60	52.0	31	64.0	31	36.0	11
Aug. 3	33.4	67	48.8	35	63.0	47	37.3	14
10	33.7	70	51.1	22	61.5	24	35.5	12
17	36.4	58	52.8	24	63.5	22	36.5	13
24	34.6	55	51.4	33	54.4	26	----	--
31	34.4	73	51.6	26	64.7	23	----	--
Sept. 7	40.7	62	54.3	26	62.9	31	----	--
11	37.5	55	53.2	59	62.9	44	----	--
18	41.7	59	53.5	37	63.8	46	----	--
25	38.6	54	52.7	33	67.4	28	----	--
Oct. 2	42.7	67	53.3	42	63.0	42	----	--
9	41.1	53	53.9	34	----	--	----	--
16	35.9	92	55.1	41	57.4	30	----	--
23	38.8	54	52.7	26	62.6	21	----	--
30	40.1	66	52.4	29	62.3	35	----	--
Nov. 6	37.5	59	52.0	30	62.1	27	----	--
13	39.5	68	53.4	33	64.5	36	----	--
20	37.8	60	53.4	34	47.0[1]	16	----	--
Mean	38.2[2]	64	52.7	33	58.2	31	----	--

[1]Composite of Mission wells Nos. 1 and 3; No. 2 not running.

[2]Equivalent to 220 parts per million total salts.

Limoneira Laboratory (cont'd)

Two water supplies used on the lemon orchards in the vicinity of Santa Paula are compared in Table 50/28. Gravity water from the Santa Clara River is the principal source, but this is augmented by wells located in or near Santa Paula.

Table 50/28.- Comparison of the waters of the Farmers Ditch and the Thermal Belt line near Santa Paula with respect to specific conductance and boron content. The specific conductance is expressed as K or reciprocal ohms x 10^{-5} at 25° C., and the boron as parts per 100 million.

Date 1928	Farmers Ditch K	Farmers Ditch B	Thermal Belt K	Thermal Belt B
July 6	148	54	----	--
16	143	63	145.5	69
23	137	57	134	56
30	134	54	135	57
Aug. 7	134	48	131	50
14	132.5	54	133	51
21	132	33	128.7	62
28	136	44	136	55
Sept. 4	114.8	46	128.7	48
11	126	34	137.6	38
18	126	45	131.4	39
25	134	48	126.5	54
Oct. 3	129.3	50	143.7	61
9	145.7	60	138.9	66
16	107.3	87	135.8	70
23	145	77	130.5	62
30	144.5	75	122	59
Nov. 6	144	80	135	69
13	163	91	160.3	74
20	137.5	68	118.0	--
Mean	135.6*	59	134.0	58

*Equivalent to 1050 parts per million total salts.

Mr. Scofield made a trip to Yuma and Imperial Valley the latter part of November to investigate the boron conditions in those areas. He brought back several samples of soils, leaves, and waters.

Since the last report, on November 24, we have handled 29 water samples and 9 additional leaf samples.

L. V. Wilcox.

Newlands

Mr. E. W. Knight reports as follows under date of November 21:

"The usual fall plowing and rotation treatments have been carried out, and everything at present is being put in shape for a cold winter.

"The Fallon Turkey Growers' Association are loading some ten to twelve cars of dressed turkeys. They are receiving 42 cents a pound for

Newlands (cont'd)

No. 1 toms and 40 cents a pound for No. 1 hens. Second grade sells for 10 cents a pound less. These prices are all f.o.b. Fallon. The price is somewhat less than last year, but seems to be about as high here as elsewhere.

"The following tables give the yields of crops on the station this year.

Alfalfa Yields in 1928

Plots	Yield in pounds				Area, acres	Yield per acre	
	First crop	Second crop	Third crop	Total yield		Pounds	Tons
B	17,665	17,855	15,285	50,805	5.16	9,846	4.92
D-2	1,130	1,150	945	3,225	.32	10,078	5.04
3	1,000	1,050	800	2,850	.34	8,382	4.19
6	1,730	1,610	1,430	4,770	.54	8,833	4.42
7	1,205	1,375	1,220	3,800	.51	7,451	3.73
F-2	1,095	1,150	1,360	3,605	.52	6,933	3.47
3	1,635	1,610	1,680	4,925	.52	9,471	4.74
4	1,595	1,475	1,500	4,570	.52	8,788	4.39
5	1,710	1,750	1,750	5,210	.52	10,019	5.10
7	1,385	1,475	1,380	4,240	.52	8,154	4.08
G1-5	5,565	5,010	4,255	14,830	1.90	7,805	3.90
H-1	1,385	1,340	1,025	3,750	.40	9,375	4.69
2	1,230	1,220	890	3,340	.40	8,350	4.18
3	2,000	2,070	1,685	5,755	.40	14,388	7.19
4	2,110	2,010	1,685	5,805	.40	14,513	7.26
5	2,110	1,825	1,290	5,215	.40	13,038	6.52
6-12	7,230	5,380	4,060	16,670	2.10	7,938	3.97
J-1	1,650	1,450	1,140	4,240	.49	8,653	4.33
2	1,585	1,430	1,205	4,220	.49	8,612	4.31
3	1,570	1,490	1,180	4,240	.49	8,653	4.33
4	2,000	1,920	1,600	5,520	.49	11,265	5.63
5	1,930	2,010	1,575	5,565	.49	11,357	5.68
6	1,880	2,090	1,515	5,495	.49	11,214	5.61
7	1,965	2,000	1,650	5,615	.49	11,459	5.73
8	2,085	2,110	1,680	5,875	.49	11,990	6.00
9	2,350	2,175	1,970	6,495	.49	13,255	6.63
10	2,650	2,350	2,045	7,045	.49	14,378	7.19
11	2,535	2,300	2,000	6,835	.49	13,949	6.97
12	2,285	2,220	1,810	6,315	.49	12,888	6.44
13	2,275	2,095	1,770	6,140	.49	12,531	6.27
14	2,155	2,215	1,865	6,235	.49	12,724	6.36
Y-6	1,345	1,200	1,275	3,820	.45	8,489	4.24
7	1,450	1,415	1,390	4,255	.45	9,456	4.73
8	1,160	1,070	1,185	3,415	.45	7,589	3.79
9	1,535	1,350	1,245	4,130	.45	9,178	4.59
10	1,510	1,275	1,265	4,050	.45	9,000	4.50
Total	87,745	83,520	71,605	242,870	24.58	-----	----
Average	---	---	---	---	---	9,881	4.94

Newlands (cont'd)

Yields of Rotation Plots in 1928

Plots	Crops	Area, acres	Yield stalk	Yield corn on cob	Total yield	Total yield per acre
			Pounds	Pounds	Pounds	Pounds
D-4	Beets	.34	---	---	8,240	24,235
8	Corn silage	.50	---	---	4,995	9,990
E-3	Corn, manured	.58	2,270	1,065	3,335	5,750
4	Corn, unmanured	.59	1,450	575	2,025	3,433
5	Corn, unmanured	.57	1,365	550	1,915	3,360
6	Corn, unmanured	.54	2,160	802	2,962	5,485
F-6	Corn silage	.52	---	---	8,375	16,106
D-1	Wheat	.28	---	---	520	1,857
5	Wheat	.57	---	---	465	816
E-1	Wheat, manured	.61	---	---	1,125	1,844
2	Wheat, unmanured	.57	---	---	485	851
7	Wheat, unmanured	.49	---	---	190	388
8	Wheat, manured	.78	---	---	690	884
F-1	Wheat	.52	---	---	635	1,221
F-8	Barley	.52	---	---	660	1,269
D-2	Alfalfa	.32	---	---	3,225	10,078
3	Alfalfa	.34	---	---	2,850	8,382
6	Alfalfa	.54	---	---	4,770	8,833
7	Alfalfa	.51	---	---	3,800	7,451
F-2	Alfalfa, continuous	.52	---	---	3,605	6,933
3	Alfalfa	.52	---	---	4,925	9,471
4	Alfalfa	.52	---	---	4,570	8,788
5	Alfalfa	.52	---	---	5,210	10,019
7	Alfalfa, continuous	.52	---	---	4,240	8,154

Yields of Grain on Y Plots in 1928

Plots	Crops	Area, acres	Actual yield		Yield per acre	
			Straw & grain	Grain	Straw & grain	Grain
			Pounds	Pounds	Pounds	Pounds
Y- 2	Oats	.45	1,010	385	2,244	856
3	Oats	.45	1,575	605	3,500	1,344
4	Oats	.45	1,430	560	3,178	1,244
5	Oats	.45	690	230	1,533	511
11	Wheat	.45	795	260	1,767	578
12	Wheat	.45	1,000	365	2,222	811
13	Wheat	.45	2,070	900	4,600	2,000
14	Wheat	.45	1,885	750	4,189	1,667
18	Wheat	.45	1,160	475	2,578	1,056

Newlands (cont'd)

The comparative monthly weather report for November

	1928	22-year average
Temperature, mean maximum	54.6	56.1
" , mean minimum	23.6	24.3
" , mean	39.1	40.7
" , highest	67.0	71.7
" , lowest	8.0	10.3
Precipitation, inches	.41	.31
Wind velocity, miles per hour	1.45	2.32
Evaporation, inches	1.41	1.87
Days clear	10.0	17.2
" partly cloudy	6.0	6.3
" cloudy	14.0	10.5."

Prosser

Electrical conductance determinations on various soil samples were continued during the week ending November 17. To extract unmixed samples of soil from depths of 8 to 10 feet is a difficult task and rather unsatisfactory with present sampling equipment. Any effort to improve the ordinary tube or auger method and equipment of drawing samples should be widely encouraged.

The annual State Irrigation Institute was held at Ellensburg during the week. Four papers pertaining to irrigation agriculture were contributed from this station. A large part of the Institute meeting was devoted to a discussion of the possible legal means by which Irrigation District bonds might be strengthened. The question of equalizing assessments on irrigated lands and limiting the liability of the individual landowner thereon, together with various methods of making collections more effective, was freely discussed. A resolution to be presented to the legislature requesting that the State appropriate money from its reclamation fund to buy Irrigation District bonds was finally adopted.

During the week ending November 24 water samples were collected from three series of test-wells located adjacent to large, open drains in water-logged and alkali areas in the vicinity of Grandview. Tests for total salts were made on these in the laboratory. Most of the samples apparently represent comparatively fresh water. One series, however, showed a conductance of more than 150. Ground-water elevations were also recorded on these test-wells. A slight rise in the ground-water table is noticeable as compared to last month's readings.

The Pacific Northwest Potato Growers' Association held its annual potato show and conference at Spokane during the week. The crop specialist and horticulturist from this Station attended and presented papers.

Farm work during the week consisted of fall plowing and regular winter feeding of the beef cattle, dairy cows, work stock, and hogs.

C. C. Wright.

W E E K L Y R E P O R T S
Of The Office Of
WESTERN IRRIGATION AGRICULTURE

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Belle Fourche

Mr. Aune reports as follows on the lamb-feeding test for the first 60 days, giving the ration used in each lot and the average gain:

Lots	Average gain in 60 days
No. 1- Dry pulp and alfalfa	17.5 pounds
No. 2- Dry pulp and cottonseed cake and alfalfa	17.5 "
No. 3- Barley and alfalfa	15.6 "
No. 4- Oats and alfalfa	16.4 "
No. 5- Corn and alfalfa	19.4 "
No. 6- Pressed pulp, cottonseed cake, and alfalfa	15.8 "
No. 7- Pressed pulp and alfalfa	12.4 "
No. 8- Pressed pulp, molasses, and alfalfa	11.8 "
No. 9- Pressed pulp first 60 days, finish on barley, cottonseed cake, and alfalfa	12.2 "
No.10- Barley, cottonseed cake, amd alfalfa	17.0 "
No.11- Corn, cottonseed cake, and alfalfa	19.8 "
No.12- Corn, linseed cake, and alfalfa	17.9 "
No.13- Dry pulp, barley, cottonseed cake,and alfalfa	17.5 "
No.14- Dry pulp, linseed cake, and alfalfa	17.7 "

Variety Test of Sugar Beets on the Field Station in 1928

Previous cropping of land:

The soil is designated as Pierre clay. The native vegetation was Buffalo grass. The land was plowed first in the summer of 1907. From 1908 to 1917 it was used for forage crop experiments. From 1918 to 1925 it was cropped to corn and small grain. Sweet clover was planted with the small grain in 1925 and pastured with sheep in 1926 and planted to potatoes in 1927.

Land preparation, 1928:

The land was not plowed in the fall of 1927 after the potatoes were harvested, but in the spring it was gone over with the duckfoot cultivator, harrowed, and leveled. Four rows of each variety of beets were planted April 23 and repeated four times. The size of the plots was one-fiftieth of an acre.

Treatment after seeding:

The beets were up May 22 and there was a good stand of all varieties. On June 14 they were thinned 12 to 14 inches in the row. They were cultivated May 29, June 21, and July 2, furrowed July 13, hoed June 26, irrigated August 2, 17, and 29, and harvested October 23 to 27.

Climatic data

The growing season as to temperature averaged 1 degree below normal. The rainfall from May to September, inclusive, was 13.17 inches as compared with the average of 10.87 inches. The last killing frost in the spring occurred on April 23 and the first killing frost in the fall on September 24.

Belle Fourche (cont'd)

The following table gives the data gathered from the sugar beet variety test.

Yield of Irrigated Sugar Beet Varieties on the Field Station, 1928

Variety	Stand count, Acre avg.	Yield per acre-tons 1st plot	2d plot	3d plot	4th plot	Avg. yield, tons	%Sugar in beets	% Purity	Wt. per beet, oz.	Sugar per acre, lbs.
Schreiber	22.300	20.42	20.17	20.42	22.60	20.90	16.0	85.1	30.0	5,691
Wohanka	21.900	17.72	18.70	18.47	18.47	18.34	16.1	84.2	26.8	4,972
Dippe	20.700	19.45	20.65	19.67	19.92	19.92	17.3	86.7	30.8	5,975
Pioneer	22.375	22.10	21.62	23.07	22.10	22.22	16.9	86.4	31.8	6,489
N-1	24.450	19.67	19.67	21.37	23.32	21.01	18.2	86.4	27.5	6,608
N-7	24.240	18.47	20.90	22.35	20.65	20.59	16.9	81.9	27.2	5,699
N-10	23.640	17.50	20.65	20.90	21.12	20.04	18.7	87.1	27.1	6,528
N-2	24.085	18.47	20.17	19.92	23.32	20.47	18.5	87.6	27.2	6,635
N-3	24.550	15.80	18.95	18.95	20.42	18.53	19.2	88.4	24.2	6,291
N-9	25.625	17.72	19.20	20.90	19.67	19.37	17.6	84.9	24.2	5,788
Kleinwanzlebner	27.530	---	---	---	18.95	18.95	17.6	86.9	22.0	5,796
Maximum	27.530	22.10	21.62	23.07	23.32	22.22	19.2	88.4	31.8	6,635
Minimum	20.700	15.80	18.70	18.47	18.47	18.34	16.0	81.9	22.0	4,972
Average	23.765	18.73	20.07	20.60	20.96	20.03	17.5	86.0	27.2	6,043

Beyer Aune.

Limoneira Laboratory

The last two weeks have been devoted largely to cleaning up routine analytical work that had accumulated in the laboratory. We have now handled over 500 water samples and 58 leaf samples since July 1. Fifteen water sources are being sampled weekly.

Dr. F. M. Eaton of the Rubidoux Laboratory at Riverside, California, spent two days with us last week. Mr. Scofield was here the most of this week.

L. V. Wilcox.

Newlands

Comparative Weather Report for the Month of December

	1928	22-year average
Temperature, mean maximum	43.3	43.9
" , mean minimum	14.7	18.8
" , mean	29.0	30.5
" , highest	58.0	60.7
" , lowest	1.0	3.0
Precipitation, inches	.20	.55
Wind velocity, miles per hour	1.50	2.32
Evaporation, inches	.63	.88
Days clear	17.0	14.2
" partly cloudy	5.0	6.3
" cloudy	9.0	10.5

San Antonio

Temperatures during the three weeks ending December 1 were slightly below normal, with the mean for the month of November 2.5 degrees below the average mean for the past 21 years. The first killing frost of the season occurred the night of November 20 when a minimum of 31 was recorded. Throughout most of the region only the tips of the most tender ornamentals and such truck crops as tomatoes and beans were killed. The frost-free period for the season included 249 days, the last killing frost in the spring having occurred March 16. The average number of frost-free days for the preceding 21 seasons is 260 days. A summary of the climatological data recorded during the period is given below:

Week ending	Temperature (degrees F.)					G. D. R.	Precipitation	Sky (days)		
	Maximum		Minimum		Mean					
	Absolute	Mean	Absolute	Mean				Clear	Partly cloudy	Cloudy
							Inches			
Nov. 17	82	75.0	46	55.7	65.4	30	.10	2	1	4
" 24	74	67.4	31	38.4	52.9	34	--	4	2	1
Dec. 1	74	60.0	38	45.3	52.6	20	.21	0	0	7
Month of Nov.	82	68.8	31	47.6	58.2	40	1.89	10	6	14

Crib-dry percentages have been computed for the corn experiments, and the yields from all station plantings are given in the two following tables.

Corn yields (crib dry) from rotation and tillage experiments

Rank	Rotation	Yield, bushels per acre		Shelling percentage
		Ear corn	Shelled	
18	A4-B	11.5	11.6	80.8
13	D	15.6	17.1	87.3
16	A6-A	12.1	12.4	81.6
15	B	13.7	14.1	82.1
12	C	16.0	16.5	82.3
5	D	20.2	20.7	82.1
3	E	22.4	22.2	79.3
4	F	20.5	19.7	76.7
17	B5-1	11.9	12.1	80.9
21	2	8.9	8.8	79.5
20	C	9.6	9.6	80.0
19	D	10.3	10.1	78.5
9	B6-A	16.4	16.9	82.2
8	B	17.3	16.8	77.6
11	C	16.3	16.2	79.5
9	D	16.4	16.7	81.6
7	E	18.5	18.7	80.9
14	F	15.5	16.1	82.7
6	G	19.5	19.7	80.7
2	H	24.6	24.7	80.4
1	I	26.1	26.0	79.6
Average		16.3	16.5	80.8

San Antonio (cont'd)

Corn Yields, Variety Test, 1928

Variety	Yield per acre, bus. ear corn				Shelling percentage			
	1st Plot	2d Plot	3d Plot	Average	1st Plot	2d Plot	3d Plot	Average
Laguna - San Antonio	12.6	10.2	15.0	12.6	79.6	79.0	79.0	79.2
Laguna - Miss. ..	12.5	8.4	14.8	11.9	76.5	73.5	78.8	76.3
Chisholm	13.0	7.9	12.5	11.1	79.1	71.2	76.6	75.6
Surcropper	18.2	13.9	17.4	16.5	76.1	74.9	72.2	74.4
Ferguson Yellow Dent	11.9	9.6	14.2	11.9	81.4	76.9	80.4	79.6
Evins Yellow Dent	10.8	9.6	13.7	11.4	80.9	79.2	80.7	80.3
Horton	9.9	5.5	12.3	9.2	78.2	79.2	80.8	79.4
Thomas	10.4	10.1	10.9	10.5	83.5	85.1	85.5	84.7
Reese Drought Resistant	15.0	17.1	16.8	16.3	74.3	76.3	74.0	74.9
Hastings Prolific	4.9	7.0	7.6	6.5	68.1	77.6	86.7	77.5
Delta Prolific	7.6	11.4	13.4	10.8	79.4	80.7	82.9	81.0
Delta Prolific Double crossed	11.4	14.6	13.1	13.0	80.6	81.3	84.8	82.2

All the station corn was very severely defoliated and the stalks bruised and broken during a severe wind and hail storm June 10. As a result of this damage the grain was poorly developed and all yields were greatly reduced.

Station activities have included the fall plowing, manuring, and subsoiling of rotation plots; planting a small grain variety test on Field D-3; soil moisture sampling; repair of the greenhouse roof and heating system; and miscellaneous weeding and care of grounds.

Mr. S. H. Hastings spent November 15 to 17, inclusive, in visiting the station and acquainting himself with agricultural conditions in the vicinity.

Report for December, 1928

The month of December was slightly colder than normal, although no unusually low temperatures were experienced. Killing frosts occurred every night, except one, from December 19 to 26, inclusive. A rather high percentage of flax seedlings, which had emerged from plantings made December 4, were killed during this period. Following is a summary, by weeks, of the meteorological data recorded for the month.

Week ending	Temperature (degrees F.)					G. D. R.	Precipitation	Sky (days)		
	Maximum		Minimum		Mean			Clear	Partly cloudy	Cloudy
	Absolute	Mean	Absolute	Mean						
							Inches			
Dec. 8	84	63.8	32	41.0	52.3	41	.85	2	2	3
" 15	70	62.0	37	44.3	53.1	30	1.33	1	2	4
" 22	73	57.4	26	32.3	44.9	33	.23	2	2	3
" 29	78	71.1	28	36.0	53.6	47	--	2	5	0
Month of December	84	63.4	26	38.4	50.9	47	2.41	7	11	13

San Antonio (cont'd)

Frequent showers and lack of drying weather interfered greatly with field operations. Flax experiments were planted as follows:

Variety test (10 varieties)	Field D-4 - Dec. 26
Classification nursery (288 rod rows)	Field D-3 - Dec. 27
Time of planting - 1st plot	Field D-3 - Dec. 4
Time of planting - 2d plot	Field D-3 - Dec. 27

Selection 1913 oats was planted in three plots on the 28th, in connection with the cotton rootrot-fallow experiments in Field C-5. Approximately 2½ acres at the south ends of fields B-3 and C-3 were planted to Texas Red Rustproof oats December 29.

Fifty-six glazed, earthenware jars of 5-gallon capacity were filled with soil representative of this region and planted to cotton for use in studying cotton rootrot under greenhouse conditions. About 300 cotton cuttings were also started in the greenhouse for such studies. This work is in cooperation with Dr. D. C. Neal, Senior Pathologist, Office of Cotton, Rubber, and Other Tropical Plants.

Aside from the operations incident to making the above plantings, farm labor was kept busy at miscellaneous odd jobs in connection with the upkeep of buildings and grounds.

Paul R. Dawson and W. M. Jordan of the Bureau of Chemistry and Soils, with headquarters at Austin, Texas, spent December 13 to 15, inclusive, at the station and in the vicinity of San Antonio. Dr. D. C. Neal spent December 17 at the station.

Geo. T. Ratliffe.

Yuma

Report for December.

The maximum temperature for the month of December was 78, minimum 26.5, greatest daily range 44. No precipitation was recorded. A heavy river fog occurred during the night of the 28th.

For the year 1928, the maximum temperature of 115 occurred on July 24 and August 8. The minimum temperature for the year was 26, recorded on February 17. Below freezing temperatures were recorded on eight days in January, four in February, and ten in December. The frost-free period for 1928 was 269 days.

All past records for dryness were broken during the past year. In only three months--February .18 of an inch, March .06 of an inch, and October .22 of an inch--was there any precipitation. The total for the season was .46 of an inch.

The harvesting of cotton on the project continues very slowly. On many of the places farmed by owners the cotton has all been picked, and the stalks cut and plowed under. On the farms operated by tenants the operations are lagging. The following table shows the gin owners and location of the gins, the output for the season, and a comparison of production with previous years.

Yuma (cont'd)

Ginning report for the week ending Thursday, December 27

Owner	Location	Bales Ginned
Yuma Farmers Co-operative Association	Somerton	3,015
	Gadsden	1,960
	Avenue C	920
	Bard	1,560
	Gila	1,406
Pacific Cottonseed Products Corporation	Somerton	2,985
	Gadsden	1,525
	Roll	507
Sturges Bros.	Somerton	1,085
	Midway	1,040
	Avenue C,10th St.	2,500
S. E. Larkins	Yuma	740
	Winterhaven	1,745
Globe Grain & Milling Co.	Somerton	810
	Colorado Siding	301
Independent Gins	J. W. Buckelew	1,115
	J. G. Boswell Co.	1,260
	Total ...	24,474

	Bales Ginned
1927	15,069
1926	23,966
1925	23,386
1924	23,034
1923	12,497
1922	6,224
1921	7,649
1920	19,529
1919	18,987
1918	14,002

Lettuce packing on the project has continued; the prices were very good during most of the past month.

Station work has included the picking of cotton; plowing, disking, and planting of barley, wheat, and alfalfa; hauling manure; cleaning ditches; repairing irrigation system; general hoeing, cultivating, and irrigating.

E. G. Noble.

I N D E X

San Antonio (cont'd)

Scotts Bluff

Yuma

Miscellaneous